

OCTOBER 1906.]

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PROCEEDINGS
OF THE
LINNEAN SOCIETY OF LONDON.



118TH SESSION.

FROM NOVEMBER 1905 TO JUNE 1906.

LONDON:

PRINTED FOR THE LINNEAN SOCIETY,
BURLINGTON HOUSE, PICCADILLY, W.,

BY TAYLOR AND FRANCIS, RED LION COURT, FLEET STREET.

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Publications of the Society issued during the period, 31st July, 1905, to 31st July, 1906 :—

Journal (Botany), No. 255–256,	20th Dec., 1905.
„ 259,	30th Sept., 1905.
„ 260,	23rd July, 1906.
„ (Zoology), No. 193,	21st Feb., 1906.
„ 194,	23rd July, 1906.

Transactions (2nd Ser. Botany), Vol. VII. Part III.,	April 1906.
„ „ IV.,	Sept. 1906.
„ (2nd Ser. Zoology), Vol. IX. Part x.,	July 1906.
Vol. X. „ IV.,	Nov. 1905.
„ V.,	Feb. 1906.

Proceedings, 117th Session, 1904–1905, October 1905.

List of [Fellows, Associates, and Foreign Members], 1905–1906.

PROCEEDINGS
OF THE
LINNEAN SOCIETY OF LONDON.

(ONE HUNDRED AND EIGHTEENTH SESSION,
1905-1906.)

November 2nd, 1905.

Prof. W. A. HERDMAN, F.R.S., President, in the Chair.

The Minutes of the General Meeting of the 15th June were read and confirmed.

Colonel Arthur Henry McMahon, C.S.I., C.I.E., was admitted a Fellow.

Mr. Jesse Reeves was elected a Fellow.

Mr. Oakes Ames, A.B., A.M., Harvard; Mr. Edward Archibald Smith, M.B., F.R.C.S.; The Rt. Hon. William Geoffrey Bouchard de Montmorency, Viscount Mountmorres; and Mr. Alfred Douglas Hardy, were proposed as Fellows.

The Rev. GEORGE HENSLOW, M.A., F.L.S., exhibited the tails of trout and grayling to show the heterocercal origin of the homocercal tail, by means of the hypural bones which balance the vertebra turning upward towards the upper lobe.

The Rev. GEORGE HENSLOW then delivered an address on "Plant Oecology, interpreted by direct response to the conditions of Life." He remarked that Plant Geography and Plant Surveying—that is, Phytotopography—comprise records of the fluctuating

distribution of species within definite areas, Associations, the result of Natural Selection, which he defined as the Struggle for Existence, and the Survival of the better-adapted under the circumstances.

Oecology proper, or the Physiology of Plant-geography, implied what had been defined by Prof. Tansley as "The Study of the vital relations of Organisms to their Environment." These include the origin of adaptive structures, as varietal, specific, and generic characters, by means of the protoplasmic response to what was formulated by Darwin as "The Direct Action of the Conditions of Life, leading to definite results, whereby new subvarieties arise without the aid of Natural Selection."

These statements were illustrated by specimens, diagrams, and lantern-slides.

The President opened the discussion, which was carried on by Mr. H. M. Bernard, Dr. D. H. Scott, Mr. W. F. Kirby, Rev. T. R. R. Stebbing, Mr. H. Groves, Dr. W. G. Ridewood (who pointed out the use of "Adaptation" in two senses), and Mr. W. C. Worsdell, and the lecturer replied.

November 16th, 1905.

C. B. CLARKE, Esq., F.R.S., Vice-President, in the Chair.

The Minutes of the General Meeting of the 2nd November were read and confirmed.

The following resolution was put from the Chair, and after adoption was signed by the Chairman and Secretaries for transmission to the President:—

"The Fellows of the Linnean Society of London in General Meeting assembled, 16th November, 1905, congratulate the University of Liverpool on the approaching inauguration of the new Zoological Department, and request their President, Professor Herdman, to convey the expression of their good will and good wishes to the Chancellor, Council, and Senate of the University on that occasion."

Messrs. H. and J. GROVES exhibited a number of specimens of British Water *Ranunculi*, with the purpose of showing the modifications in the form of the leaves. They pointed out that the species might be roughly grouped under three headings: (1) those in which only broadly lobed aerial leaves were produced; (2) those in which submersed multifid leaves with capillary segments were also produced; and (3) those with multifid leaves only: that although the plants of the first group as a rule occurred only on mud or in shallow water, those of the second and third

groups frequently occurred together; and they suggested therefore that it required something more than the "direct response to the conditions of life" to account for the different behaviour of closely allied plants growing under precisely the same conditions.

The Rev. T. R. R. STEBBING exhibited a photograph showing, of the natural size, the otoliths from thirty-five species of fishes, a collection made by the late David Robertson, LL.D., F.L.S., "The Naturalist of Cumbrae."

Mr. E. M. HOLMES exhibited a leaf and seed of *Macrozamia spiralis*, Miq., from Queensland, where it is stated to cause symptoms of paralysis of the hind-quarters of cattle eating the leaves. The chemical nature of the constituents of the plant appear to be unknown.

Prof. F. W. Oliver contributed some remarks on the subject of this exhibition.

The following paper was read and discussed:—

"Contributions to the Embryology of the Amentiferae. Part II.: *Carpinus Betulus*." By Margaret Benson, D.Sc., F.L.S., Elizabeth Sanday, B.Sc., and Emily Berridge, B.Sc., F.L.S.

December 7th, 1905.

Prof. W. A. HERDMAN, F.R.S., President, in the Chair.

The Minutes of the General Meeting of the 16th November were read and confirmed.

Mr. Edward Russell Burdon and Mr. Charles Gilbert Rogers were admitted Fellows.

Mr. Oakes Ames, A.B., A.M., Harvard; Mr. Edward Archibald Smith, M.B., F.R.C.S.; The Rt. Hon. William Geoffrey Bouchard de Montmorency, Viscount Mountmorres; and Mr. Alfred Douglas Hardy, were elected Fellows.

Dr. Edmund Burke, F.Z.S., Dr. William Thomas Calman, F.Z.S., Mr. William Francis Cooper, B.A. Cantab., F.Z.S., F.C.S., and Mr. Walter Draper, were proposed as Fellows.

A letter from Professor HERDMAN, F.R.S., was read, thanking the Society for the resolution passed at the General Meeting of the 16th November congratulating the University of Liverpool on the inauguration of the new buildings in the Zoological Department, which resolution had been placed in the hands of the Chancellor, and had much gratified the University and the staff of the Department.

Mr. W. T. HINDMARSH, F.L.S., sent three photographs taken by Mr. J. C. Ruddock in April last of a plant of *Shortia uniflora*, Maxim., in his rock-garden at Alnbank, Alnwick; the plant this year had 60 blooms, more than double the number it had the previous year.

Mr. H. J. Elwes and Mr. Frank Crisp spoke on the difficulty of inducing the plant to flower in cultivation, and Mr. E. M. Holmes also contributed some remarks.

Dr. A. B. RENDLE, F.L.S., showed a branch of a *Widdringtonia* from a farm belonging to the late Cecil Rhodes in Rhodesia, displaying two forms of leaves.

Mr. JAMES SAUNDERS, A.L.S., showed a series of lantern-slides illustrating the habits of Mycetozoa. His observations were practically confined to the species seen within a radius of ten miles from Luton. Out of 207 species catalogued by Mr. A. Lister from the whole world, no fewer than 96, or 46 per cent., have been found in the district specified. The species shown were *Badhamia utricularis*, *Trichia varia*, *Chondroderma radiatum*, and *Physarum leucopus*, with remarks on their irregular and uncertain appearance, and distribution in certain parts of the world.

The President commented on the exhibition, and mentioned that a small dried-up plasmodium had long served him for demonstration to his junior classes on the phenomenon of restoration to activity by moisture and warmth.

Dr. JONATHAN HUTCHINSON, F.R.S., gave a *résumé* of his paper "On the *Ætiology* of Leprosy," which was communicated by the Rev. T. R. R. Stebbing, F.R.S., Sec.L.S.; it was discussed at some length.

December 21st, 1905.

C. B. CLARKE, Esq., F.R.S., Vice-President, in the Chair.

The Minutes of the General Meeting of the 7th December were read and confirmed.

The Viscount Mountmorres and Mr. James Stuart Thomson were admitted Fellows.

Mr. CHARLES T. DRUERY, F.L.S., exhibited an aposporous seedling of *Polypodium vulgare*, with a frond bearing a well-defined prothallus at the tip. The species being impatient of close culture, rendered it difficult to treat it successfully under glass. He also showed a new case of apospory in *Cystopteris montana*, presenting the following novel features:—(1) Apospory appearing upon an

otherwise normal plant; (2) entire fronds of abnormally small size characterized by the aposporous diaphanous tissue, which is usually confined to the apices of the fronds; (3) by simple layering these have, without development of root-hairs, produced prothalli; (4) in July last this usually deciduous fern produced six minute pinnatifid fronds at the base of a normal frond, which persisted, and produced young plants from apogamic buds.

The Vice-President in the Chair, and Prof. J. Bretland Farmer contributed some critical remarks, to which Mr. Druery replied.

Dr. A. B. RENDLE, F.L.S., then gave a report of the recent Congress, in which he was the Society's delegate:—

The International Botanical Congress at Vienna in June last was attended by more than 600 botanists from all parts of the world. The most important work was that of the Conference on Botanical Nomenclature, which met daily throughout the week. The publication of Dr. Otto Kuntze's 'Revisio Generum,' in 1891, had brought to a head the discussion arising, partly, from a certain vagueness in some of the articles of the Candollean code of laws of 1867, and partly from a neglect, by some botanists, of the principles of that code. The actual work of the Conference was to discuss the various suggested amendments of, and additions to, the articles of the Code of 1867, which had been correlated and arranged in the 'Texte Synoptique' by Dr. Briquet, the official reporter-general of the International Botanical Commission appointed at the Paris Congress in 1900. The result is embodied in a set of Rules which will shortly be issued in English, French, and German. The chief points of difference between the new rules and the laws of 1867 are as follows:—

In the first place a distinction is drawn between Rules and Recommendations. The former are retroactive and deal with more important points—names or forms of nomenclature which are contrary to a rule and cannot be maintained. Recommendations deal with points of secondary importance; and while names or forms of nomenclature contrary to a recommendation are not to be regarded as a model, they cannot be rejected.

For sake of uniformity the Congress adopted the terms *Order* and *Suborder* in place of *Cohort* and *Subcohort*; thus *Order* ceases to be synonymous with *Family*. The laws of 1867 gave no precise date of departure for botanical nomenclature; the new code states that botanical nomenclature begins with the 'Species Plantarum' of Linnæus, ed. 1 (1753). Names of genera appearing in this work may be associated with the descriptions which are given in the 'Genera Plantarum,' ed. 5 (1754). To obviate the loss of well-known generic names by a strict adherence to the law of priority, a list of names, to be retained in all cases, was approved by the Conference and will form an appendix to the new code. The articles of the original code dealing with method of formation of names have been made more precise and placed in the new code

as recommendations. A veto is put on the use of the binary form for subspecific or varietal names.

Publication is restricted to the sale or public distribution of printed matter or indelible autograph; the issue of sets of plants with numbers does not constitute publication. On and after January 1, 1908, new names will not be valid unless accompanied by a latin diagnosis, and the same time limit is put on the acceptance of plates with analyses but without description. Precision in publication is emphasized by two recommendations, as to the accurate dating and paging of reprints from Journals.

Priority of place is not recognized; to the original article of A. De Candolle, which provided that for names of the same date the author chooses which he will adopt, the new code adds "and this choice cannot be modified by subsequent authors."

In the case of transference of names the Congress upheld the principle of 1867, which insisted on the retention of the original name; a genus, species, or subspecies must retain its generic, specific, or subspecific name, in case of transference, provided its rank is unaltered. *Betula incana*, Linn. f. (1781), when transferred to the genus *Alnus*, becomes *Alnus incana*, Willd. (1805), in spite of an earlier name under *Alnus*, viz. *A. lanuginosa*, Gilib. (1792). Where, however, the rank changes in the transference this rule is not insisted on; thus *Primula veris*, L., var. *acaulis*, L. (1753), is written *P. vulgaris*, Huds. (1762), since the latter combination is earlier than *Primula acaulis*, Jacq. Where, however, a transference leads to tautology, the resulting combination is rejected; botanical nomenclature thus becomes freed from absurdities such as *Linaria Linaria*.

The articles of the old code dealing with the alteration or rejection of names were made more stringent; a name cannot be rejected on account of the existence of an older homonym which by general consent is regarded as non-valid—the principle of "once a synonym always a synonym" is not accepted. Nor, as was allowed under the old code, may a name be rejected because it is obviously unsuitable: a name is a name, and once given cannot be altered unless it is contrary to rules.

The last article of the code provides that the rules of nomenclature may be altered only by competent authors at an expressly convened international congress. Several recommendations are appended urging the exclusive use of the metric system for weights and measurements and the Centigrade method of expressing degrees of temperature; and authors are requested to indicate clearly the scale employed in their illustrations.

The speaker expressed the hope that the new code would lead to uniformity of nomenclature, and thereby save much valuable time for workers in systematic botany, as well as add to the convenience of botanists generally.

The discussion was opened by the Vice-President in the Chair, and carried on by Dr. Stapf, Lieut.-Col. Prain, Mr. John Hopkinson,

Mr. F. N. Williams, the General Secretary, and Mr. Henry Groves, and replied to by Dr. Rendle.

The following papers were read and discussed:—

1. "*Cyrtandreæ Malayæ insularis novæ*." By Dr. Fritz Kränzlin. (Communicated by Dr. Otto Stapf, F.L.S.)
2. "On Characeæ from the Cape collected by Major A. H. Wolley-Dod, R.A." By H. and J. Groves, F.L.S.

January 18th, 1906.

Prof. W. A. HERDMAN, F.R.S., President, in the Chair.

The Minutes of the General Meeting of the 21st December were read and confirmed.

Mr. Jesse Reeves was admitted a Fellow.

Dr. Edmund Burke, F.Z.S., Dr. William Thomas Calman, F.Z.S., Mr. William Francis Cooper, B.A. Cantab., F.Z.S., F.C.S., and Mr. Walter Draper, were severally elected Fellows.

Miss Nina Frances Layard, Mr. Frank Morey, and Mr. Arthur Ernest Bousfield Steains, were proposed as Fellows.

Mr. WILLIAM CARRUTHERS, F.R.S., a past-President of the Society, on the part of the following list of Subscribers, presented a portrait of Prof. S. H. VINES, D.Sc., F.R.S., President from 1900 to 1904, painted by the Hon. John Collier, and the President in the Chair accepted the gift on behalf of the Society.

Anderson, Prof. R. J.
Archer-Hind, T. H.
Avebury, The Lord.

Baker, J. G., F.R.S.
Balfour, Prof. I. B., F.R.S.
Barber, C. A.
Bentley, B. H.
Bisset, J.
Blackman, V. H., M.A.
Boodle, L. A.
Bower, Prof. F. O., F.R.S.
Brandis, Sir D., K.C.I.E., F.R.S.
Brown, Dr. H. T., F.R.S.
Burkill, I. H.

Carruthers, W., F.R.S.
Christy, G.
Christy, T.
Clarke, C. B., F.R.S.

Darwin, F., F.R.S.
Drabble, Dr. E.

Druce, G. C., M.A.
Drummond, J. R.
Duthie, J. F.
Dyer, Dr. B. S.
Dyer, Sir W. T. Thiselton-, K.C.M.G.,
F.R.S.

Edwards, S.
Errera, Prof. L.
Evans, Sir John, K.C.B., F.R.S.
Ewart, Dr. A. J.

Forbes, F. B.
Ford, C., I.S.O.
Foster, Sir M., K.C.B., F.R.S.
Fry, G.
Fry, Rt. Hon. Sir E., F.R.S.

Gamble, J. S., F.R.S.
Gardiner, W., F.R.S.
Geffcken, A. W.
Godman, F. D., F.R.S.
Green, Prof. J. Reynolds, F.R.S.

Grocm, Prof. P.	Peckover, A., LL.D.
Günther, Dr. A., F.R.S.	Percival, Prof. J., M.A.
Günther, R. T., M.A.	Phillips, Dr. R. W., M.A.
Gwynn-Vaughan, D. T.	Potter, M. C., M.A.
	Poulton, Prof. E. B., F.R.S.
Hanbury, F. J.	
Hanbury, Sir T., K.C.V.O.	Ransom, W.
Hemsley, W. B., F.R.S.	Rendle, Dr. A. B.
Henslow, Rev. G., M.A.	
Herdman, Prof. W. A., F.R.S.	Saunders, G. S.
Hill, Dr. A.	Scott, Dr. D. H., F.R.S.
Hill, T. G.	Seward, A. C., F.R.S.
Hillhouse, Prof. W., M.A.	Shillitoe, Buxton.
Hooker, Sir J. D., G.C.S.I., F.R.S.	Shipley, A. E., F.R.S.
Hopkinson, J.	Silver, S. W.
	Smart, F. G., M.A.
Ito, Tokitaro.	Stapf, Dr. O.
	Stebbing, Rev. T. R. R., M.A., F.R.S.
Jackson, B. Daydon.	Sutton, A. W.
Jackson, W. Hatchett.	Swinhoe, Col. C., M.A.
Kanjilal, U.	
King, Sir G., K.C.I.E., F.R.S.	Trow, Dr. A. H.
Le Brocq, W. P. J., M.A.	Voelcker, Dr. J. A.
Massee, G.	Wager, H., F.R.S.
Masters, Dr. M. T., F.R.S.	Walker, A. O.
Middleton-Wake, Rev. C. H., M.A.	Ward, Prof. H. Marshall, F.R.S.
	Watt, Sir G.
Newton, Prof. A., F.R.S.	Weiss, Prof. F. E.
Nicholls, C. H.	Woodward, Dr. A. Smith, F.R.S.
	Worsdell, W. C.
Oliver, Prof. F. W., F.R.S.	

Mr. T. ERNEST WALTHAM exhibited a series of coloured transparencies from flowers in natural colours, partly by the three-colour process, partly by hand. They were shown on frames specially devised, the light being reflected from beneath, and a frame with a stereoscope slid along above the series. One admirable lantern-slide was displayed upon the screen, to show the success of the process. Mr. A. O. Walker and Dr. A. B. Rendle contributed some remarks.

The following papers were read and discussed:—

1. "The Life-History of *Margaritifera Panasesæ*." By A. W. Allen. (Communicated by the Rev. T. R. R. Stebbing, F.R.S., Sec.L.S.)
2. "On some Endophytic Algæ." By A. D. Cotton, F.L.S.
3. "On the Organ of Jacobson in *Sphenodon*." By Dr. R. Broom. (Communicated by Prof. A. Dendy, F.L.S.)

February 1st, 1906.

Prof. W. A. HERDMAN, F.R.S., President, in the Chair.

The Minutes of the General Meeting of the 18th January were read and confirmed.

Dr. William Thomas Calman was admitted a Fellow.

Mr. Hugh Findon, Mr. James Eustace Radcliffe McDonagh, M.R.C.S., L.R.C.P., Mr. Thomas Hawkes Russell, and Mr. Ernest Justus Schwartz, M.A. Cantab., B.Sc.Lond., were proposed as Fellows.

By special invitation of the Council, Mr. J. STANLEY GARDINER, M.A., gave an account of the Percy Sladen Trust Expedition in H.M.S. 'Sealark' to the Indian Ocean, of which he was leader.

In 1904, at the request of the Royal Society, His Majesty's Government agreed to allow the Author to undertake a six months' cruise in H.M.S. 'Sealark' in the following year, to investigate the western part of the Indian Ocean between India and Madagascar. The author was responsible for the whole work, and with Mr. Forster Cooper took charge especially of the biology and geology, while Commander Boyle Somerville and the Officers of H.M.S. 'Sealark' did most of the practical work connected with the oceanography.

Leaving Colombo on May 9, 1905, H.M.S. 'Sealark' proceeded to the Chagos Archipelago, where a stay of two months was made: Salomon, Peros Banhos, Diego Garcia, and Egmont, all ring-shaped reefs with land, were carefully examined, and the first resurveyed on a big scale. The reefs were found to be very largely formed by calcareous algæ, and the marine fauna to be singularly poor in species. Numerous soundings were put down between the different atolls and banks, and sections were run off Salomon Atoll, where also a series of dredgings was obtained. The talus slope off the reefs was very marked, and the bottom between the different banks was found to be current-swept down to 500 fathoms.

The expedition having left Mauritius on August 22nd, the submerged Nazareth and Saya de Malha Banks were examined and dredged. Coetivy was next visited, and its fauna and flora, terrestrial and marine, carefully collected for comparison with the Chagos. The line between Madagascar and Seychelles was then investigated. The low hills of Farquhar were found to be merely sand dunes, while St. Pierre turned out to be a raised coral island. Off Providence specimens were obtained of a volcanic rock, which probably forms the foundation of that coral bank. Alphonse and Desroches were subsequently visited, and the Amirante Bank was carefully dredged; Poivre Darros, St. Joseph, and Eagle Islands also being examined.

In oceanography, tidal, current, meteorological, and magnetic observations were made wherever possible, and serial temperatures and water samples were secured down to 1000 fathoms. The charts were everywhere examined and corrected, and the existence of any shallow connecting bank between India and Madagascar was disproved. About 150 dredgings were run down to 900 fathoms, and plankton was extensively collected by closing and other nets down to 1200 fathoms. The reef faunas and floras were especially collected in the Chagos and at Coetivy in view of the distribution of marine organisms, and the islands everywhere were carefully examined, their land animals and plants being collected as thoroughly as possible.

The PRESIDENT announced that amongst the visitors who had been invited to attend, all the Trustees of the Percy Sladen Trust were present, and he invited their Chairman, Mr. T. Bailey Saunders, to open the discussion. He was followed by Dr. Tempest Anderson and Mr. Henry Bury; discussion was contributed by Dr. G. C. Bourne, who contrasted his own difficulties when in Diego Garcia twenty-five years ago and the facilities at the disposal of Mr. Stanley Gardiner, Dr. G. Herbert Fowler, Dr. N. Wolfenden, Mr. A. P. Young, Mr. W. P. Pyecraft, the President concluding by a few observations, and Mr. Stanley Gardiner replied *seriatim* to the questions which had been put.

February 15th, 1906.

Dr. A. SMITH WOODWARD, F.R.S., Vice-President, in the Chair.

The Minutes of the General Meeting of the 1st February were read and confirmed.

Dr. Tempest Anderson was proposed as a Fellow.

Miss Nina Frances Layard, Mr. Frank Morey, and Mr. Arthur Ernest Bousfield Steains, were severally balloted for and elected Fellows.

Dr. H. C. BASTIAN, F.R.S., F.L.S., gave a lantern demonstration of the developmental changes in *Zooglyea*, of which the following is the author's abstract:—

Masses of *Zooglyea* in their early stage were first shown, in which the constituent Bacteria were plainly recognizable. The growth of the masses, their alteration in appearance and in reaction to staining fluids, together with the progressive segmentation which they undergo, were revealed by other specimens. Segmentation was shown to progress till minute spherical or ovoidal units were produced. During the first 3–5 days, while these changes are

occurring, the masses remain colourless and the ultimate segmentation units develop into flagellate Monads or, more rarely, into equally minute Amœbæ—myriads of one or of the other of these forms appearing (all of about the same size) where a few hours before they were absent.

Later, from 5th to 10th day, the ultimate segmentation units of other masses appear as aggregates of brown Fungus-germs. Often the masses as a whole become brown before segmentation has much advanced, and the different stages were shown by which the bacterial aggregates are completely converted into masses of brown Fungus-germs, together with the development of hyphæ therefrom. All the stages in the complete conversion of the *Zoogloea* masses into Monads or Amœbæ in the one case, or into brown Fungus-germs in the other, are clearly recognizable—though it is impossible to say from the appearance of the masses in their early stages which of these three interchangeable forms of life will ultimately be produced.

The Vice-President in the Chair having invited discussion, Prof. Dendy enquired what means were employed to exclude the entrance of foreign germs into the hay-infusion, to which the Author replied.

The following papers were read and discussed:—

1. "The Structure of *Isis hippuris* (Linnæus)." By J. J. Simpson. (Communicated by the President.)
2. "Note on the Distribution of the Genus *Shortia*, Torr. & Gray." By B. Daydon Jackson, Gen. Sec. L.S. (See p. 52.)

March 1st, 1906.

Prof. W. A. HERDMAN, F.R.S., President, in the Chair.

The Minutes of the General Meeting of the 15th February were read and confirmed.

Miss Catherine Alice Raisin, D.Sc. (Lond.), was proposed as a Fellow.

The vacancies in the List of the Foreign Members caused by the deaths of Prof. A. S. Packard and Prof. R. A. v. Koelliker having been declared, the following were proposed for election in their place:—Oscar Hertwig, Professor of Comparative Anatomy, Berlin University; and Henry Fairfield Osborn, D.Sc., Da Costa Professor of Zoology, Columbia University, New York.

Miss Nina Frances Layard, Mr. Frank Morey, and Mr. Arthur Ernest Bousfield Steains, and later, after election, Mr. Robert Hawkes Russell, were admitted Fellows.

Mr. Hugh Findon, Mr. James Eustace Radcliffe McDonagh, Mr. Thomas Hawkes Russell, and Mr. Ernest Justus Schwartz were severally balloted for and elected Fellows.

Dr. D. H. SCOTT, F.R.S., Sec.L.S., described "A New Type of Stem [*Sutcliffia*] from the Coal-Measures."

Prof. F. W. Oliver, Mr. W. C. Worsdell, Prof. A. G. Tansley, and the President joined in a discussion, and the Author replied.

The following papers were read and discussed :—

1. "Notes on some Species of *Nereis* in the District of the Thames Estuary." By Dr. H. C. Sorby, F.R.S., F.L.S.

2. "Membranous Labyrinths of *Echinorhinus* and *Cestracion*." By Prof. C. Stewart, F.R.S., F.L.S.

March 15th, 1906.

Prof. W. A. HERDMAN, F.R.S., President in the Chair.

The Minutes of the General Meeting of the 1st March were read and confirmed.

Mr. Hugh Findon, Mr. James Eustace Radcliffe McDonagh, and Mr. Ernest Justus Schwartz were admitted.

Mr. Dharendra Lal Day, M.A., B.Sc., and Colonel John William Yerbury, late R.A., were proposed as Fellows.

Dr. Tempest Anderson was elected a Fellow.

A letter from Dr. Chr. AURIVILLIUS, Secretary of the Kungl. Svenska Vetenskapsakademien, Stockholm, was read, in which presentation was made of copies by Jean Haagen of the portraits of Carl von Linné by Per Krafft the elder, and Alexander Roslin, in possession of the Academy, sent in acknowledgment of the loan of Linné's '*Philosophia Botanica*' interleaved and annotated by the author, which had been returned a few weeks ago through the Swedish Legation. A special vote of thanks for this most acceptable gift was moved from the Chair, and carried unanimously.

Dr. D. H. SCOTT, F.R.S., Sec.L.S., read a communication from Dr. R. Zeiller, F.M.L.S., conveying his good wishes for a successful discussion that evening, which he had been invited to open, but was prevented by his professorial duties at the École Nationale Supérieure des Mines, Paris.

Prof. F. W. OLIVER, F.R.S., F.L.S., then opened the announced discussion on "The Origin of Gymnosperms." (See p. 53.)

Mr. E. A. NEWELL ARBER, F.L.S., followed, on the "Earlier Geological Record of the True Ferns." (See p. 54.)

Mr. A. C. SEWARD, F.R.S., F.L.S., then spoke on "The Evolution of Gymnosperms: the Position and Ancestry of the Araucariæ." (See p. 56.)

The discussion was then adjourned to 3rd May, 1906.

April 5th, 1906.

Dr. A. SMITH WOODWARD, F.R.S., Vice-President,
in the Chair.

The Minutes of the General Meeting of the 15th March were read and confirmed.

Dr. Robert Brown, of Glasgow, and Mr. Henry John Wadlington, of Bournemouth, were proposed as Fellows.

Miss Catherine Alice Raisin, D.Sc.Lond., was elected a Fellow.

Dr. Horace T. Brown, F.R.S., and Mr. Frank Crisp were proposed as Auditors on behalf of the Council, and the Rev. R. Ashington Bullen and Mr. John Hopkinson on behalf of the Fellows, and by show of hands were duly elected.

Mr. CLEMENT REID, F.R.S., exhibited nearly 50 photographs, entitled "Some Plants new to the Preglacial Flora of Great Britain." He explained that these were derived from material procured at Pakefield, near Lowestoft, and had occasioned many months' continuous labour on the part of Mrs. Reid and himself. On a former occasion (April 21st, 1904) he had shown a series of drawings from the fruits, obtained by breaking up the matrix and selecting the liberated specimens; but this process was tedious and unsatisfactory, and he had resorted to photography. The remains were black, and therefore troublesome to photograph, but the specimens themselves could not long be preserved, as an efflorescence occurred, and they fell to pieces, but experiments were now being conducted with a view of permeating the fruits with paraffin, and so ensuring their preservation.

After some introductory remarks from the Vice-President in the Chair, a discussion followed, in which Count Solms-Laubach, F.M.L.S., Mr. H. W. Monckton, Dr. Henry Woodward, F.R.S.

(who was present as a visitor), and the Rev. T. R. R. Stebbing, F.R.S., engaged, Mr. Clement Reid replying.

The following papers were read and discussed :—

1. "A Second Contribution to the Flora of Africa: Rubiaceæ, and Compositæ Part II." By Spencer Moore, F.L.S.

2. "The Structure of the Stem and Leaf of *Nuytsia floribunda*, R. Br." By E. J. Schwartz, F.L.S. (See p. 57.)

3. "On *Taiwanites* [afterwards changed to *Taiwania*], a new genus of Coniferæ from the Island of Formosa." By B. Hayata. (Communicated by Dr. Maxwell T. Masters, F.R.S., F.L.S.)

May 3rd, 1906.

Prof. W. A. HERDMAN, F.R.S., President, in the Chair.

The Minutes of the General Meeting of the 5th April were read and confirmed.

Miss Catherine Alice Raisin, D.Sc., was admitted a Fellow.

Mr. Henry Robert Knipe, LL.B.Cantab., and Miss Evelyn Janie Welsford, were proposed as Fellows.

Mr. Dharendra Lal Day, M.A., B.Sc., and Colonel John William Yerbury, were elected Fellows; and Professor Oscar Hertwig, of Berlin, and Professor Henry Fairfield Osborn, of New York, were elected Foreign Members.

The PRESIDENT exhibited a tube of small pearls obtained from *Mytilus edulis* at Port Erin a short time previously.

Dr. D. H. SCOTT, F.R.S., Sec.L.S., then resumed the discussion on the "Origin of Gymnosperms" adjourned from the 15th March, by an address on "The Affinities of Pteridosperms and Gymnosperms." (See p. 57.)

The President having contributed a few remarks, then invited Mr. Boyd Thomson, of Toronto, who was present as a visitor, to open the general discussion. He was followed by Mr. William Carruthers, F.R.S., Prof. F. E. Weiss, Dr. A. B. Rendle, Mr. W. C. Worsdell, and Miss E. N. Thomas (a visitor). Prof. F. W. Oliver, F.R.S., and Mr. A. C. Seward, F.R.S., then replied, the President closing the discussion.

May 24th, 1906.

Anniversary Meeting.

Prof. W. A. HERDMAN, F.R.S., President, in the Chair.

The Minutes of the General Meeting of the 3rd May were read and confirmed.

Dr. Tempest Anderson was admitted a Fellow.

Mr. Henry Edward Houghton and Mr. Thomas Fox were proposed as Fellows.

The Treasurer then submitted the Statement of Accounts for the year ended 30th April, as audited, and commented on the various items. (See p. 16.) Mr. Henry Groves remarked on the satisfactory financial aspect of the Statement, but suggested that some Trustee security yielding more revenue than Consols might be chosen for investment. The Accounts on the President's motion were then approved by the Meeting.

The General Secretary read his report of deaths, withdrawals, and elections as follows:—

Since the last Anniversary 18 Fellows have died or their deaths been ascertained:

Mr. Edward Atkinson.	Mr. Frederick Lovell Keays.
Mr. John Bidgood.	Sir Robert Lloyd Patterson.
Mr. George Bowdler Buckton.	Mr. William Phillips.
Mr. Vincent Ind Chamberlain.	Mr. Richard Rimmer.
Mr. Thomas Christy.	Mrs. Constance Percy Sladen.
Rev. James Morrison Crombie.	Mr. William Sowerby.
Rt. Hon. Sir Mountstuart Elphinstone Grant Duff.	Mr. Frederick Townsend.
Hon. Charles Arthur Ellis.	Prof. Walter Frank Raphael Weldon.
Mr. Frederick John Horniman.	Mr. William Watson-Will.

FOREIGN MEMBER (1).

Dr. R. Albert von Koelliker.

The following 9 Fellows have withdrawn:

Mr. Frederick Howard Collins.	Mr. George Payne.
Mr. William Dennis.	Mr. Charles William Slater.
Mr. Charles French.	Mr. John Watson.
Mr. William Henry Heathcote.	Mr. Henry Williams.
Rev. Willis Fleming Aston Lambert.	

The following have been removed from the List of Fellows, under the provisions of the Bye-Laws, Chapter II., Section 6 :—

Mr. Ernest J. Bickford.	Mr. Harvey St. John Jackson.
Mr. Edward Russell Budden.	Mr. Thomas W. Kirk.
Mr. John William Willis Bund.	Mr. George Robert Milne
Rev. William Burgess.	Murray.
Mr. William Elborne.	Rev. Laurence Scott.
Mr. Edward A. Fitch.	Rev. John Frome Wilkinson.

One Fellow, Mr. Robert Morton Middleton, has been reinstated in the List, the annulment of his withdrawal not being received until after its announcement.

Twenty Fellows have been elected (of whom 19 have qualified), and two Foreign Members.

The Librarian's report was put in and read as follows :—

During the past year, 76 Volumes and 257 Pamphlets have been received as Donations from Private Individuals.

From the various Universities, Academies, and Scientific Societies 301 volumes and 114 detached parts have been received in exchange and otherwise, besides 70 volumes and 30 parts obtained by exchange and as Donations from the Editors and Proprietors of independent Periodicals.

The Council have sanctioned the purchase of 187 volumes and 97 parts of important works.

The total additions to the Library are therefore 634 volumes and 498 separate parts.

The number of Books bound during the year is as follows :—
In half-morocco 295 volumes, in half-calf 6 volumes, in full cloth 226 volumes, in vellum 26 volumes, in buckram 46 volumes, in boards or half-cloth 18 volumes. Relabelled (half-morocco and cloth backs) 60 volumes. Total 677 volumes.

The General Secretary having read the Bye-Laws governing the Elections, the President opened the business of the day, and the Fellows present proceeded to vote for the Council and Officers.

The President then delivered his Address.

PRESIDENTIAL ADDRESS.

FELLOWS OF THE LINNEAN SOCIETY,—

Let me thank you most heartily for your kindness in electing me as your President for a second Session. A more extended acquaintance with the work of the office has by no means diminished my sense of the difficulties that surround the position. The honour carries with it a considerable weight of responsibility, which, I am thankful to say, is shared to the full by my colleagues the Treasurer and the Secretaries—to all of whom I am much indebted for effective support and kindly consideration.

The past Session, I think I may say, has been an interesting but an uneventful one. We cannot have every year such great advances in the Constitution and Fellowship of the Society as it fell to my lot to record on our last Anniversary. The Supplemental Charter and the new Bye-Laws are historic landmarks that do their beneficent work for the Society silently and for the most part unnoticed. Our lady-Fellows, on the other hand, I am glad to say have made their presence felt both as authors and in debate. We have had further accessions of duly qualified scientific women during this Session, and we may be sure that every such admission is a strength to the Society. When they bring their work before us we shall appreciate still further the added gain.

Every biologist, man or woman, engaged in original work ought to belong to the Linnean Society—it is their natural destiny, their scientific home. There must be many outside the fold who would be glad to enter if piloted by a friendly hand, and whom we should be glad to welcome when satisfied of their qualifications and of their desire to join us in advancing Natural Science. I commend the idea—the further extension of our Fellowship by the introduction of suitable candidates—to the careful personal consideration of each and every Fellow.

In last year's Address I alluded to the retirement of Mr. Crisp from the office of Treasurer, which he had held with great advantage to the Society for over twenty years. We are fortunate in having appointed as his successor Mr. Horace W. Monckton, whom we now welcome and congratulate on the first anniversary meeting since his appointment.

In all 26 new Fellows have joined the Society this Session—after the extraordinary accession of last year we return to normal numbers. On the other side there are the inevitable losses. We have this year to regret the death of 17 Ordinary Fellows and

of one on the Foreign list; the latter being the illustrious and veteran Zoologist of Würzburg, Professor Rudolph Albert von Kölliker—recipient of the Linnean Medal in 1902.

The obituaries of our late Fellows have been prepared by the Secretaries, and will be presented to the Society in the usual manner. I do not propose to detain you by traversing the same ground, but will merely make a passing reference to two special cases.

In Mrs. Constance Percy-Sladen we lose one who had recently become a great benefactor of Science, and had founded a noble memorial of her late husband, at one time Zoological Secretary of the Linnean Society. Her interest in this Society was great, she was gratified at being admitted to our Fellowship, she was present at one of our meetings last session, and the sad news of her death was received only a few days before the meeting appointed for the reception of the preliminary account of the first Percy-Sladen Exploring Expedition promoted by the Trust that Mrs. Sladen had founded. It is no great secret, I believe, that when the Indian Ocean was omitted from the great oceanic areas explored during the 'Challenger' Expedition, Mr. Percy Sladen was one of those who earnestly hoped that some other public or private expedition would be organised to make good the omission: and that later on in life he and his wife talked of planning and promoting such an exploration themselves. Sladen did not live to carry out the plan, but the Trust founded by his widow adopted as its first venture an expedition under the leadership of Mr. Stanley Gardiner, which seemed to have that very purpose in view, and which we now know has been successfully accomplished. The name borne by our late Fellow and her husband, our former Secretary, will in the future be a familiar word in Science, and especially in our Society, as a result of the explorations supported by the Percy-Sladen Trust.

The recent terribly sudden death of Professor Weldon removes from our Society one of the most distinguished of Zoologists, still in the prime of life and in the fulness of work. Of extraordinary vigour as a lecturer and debater, full of keenness in every research that he undertook, deeply interested in the advancement of all that is best in scientific life, and having transcendent ability and superabundant energy, he was able to accomplish much in his too short working life—and it is almost impossible yet to realise that he has left his work unfinished and that other hands must now carry on what his fertile and enthusiastic mind had planned. His early death is a serious blow to Biological Science in this country, which has suffered many unexpected losses during the last quarter century—since the tragic death of Professor F. M. Balfour on the Alps in 1882.

The Howes Memorial Fund started by the Officers of this Society and other colleagues and friends of our late Zoological Secretary has now been closed, a Trust-deed has been prepared,

Trustees have been appointed, and a report upon the amount and destination of the fund has been issued by the Committee to all subscribers.

The two vacant places in our list of Foreign Members this year have been filled by the election of Professor Oscar Hertwig of Berlin, and Professor Henry Fairfield Osborn of New York. It is a matter of congratulation to the Society that these distinguished names have been added to our roll.

The Council have awarded the Linnean Medal on this occasion to the Reverend Canon A. M. Norman, F.R.S., the veteran Naturalist who has made additions to nearly every group of the British Marine Fauna. This is perhaps the highest distinction we can confer; and we are honoured by the growing list of eminent men of science whose fair fame it links to that of our Society. Last year the medal was conferred upon a distinguished foreign Botanist. This year we honour one of our own Fellows who has done much for British Science.

One of the events of the Session has been the discussion on "The Origin of Gymnosperms," which extended over two meetings. We had hoped when the proposal first came before Council that this debate might be inaugurated by our Foreign Member, Dr. R. Zeiller of Paris. However, that eventually proved impossible, and the discussion was opened on March 15th by Professor F. W. Oliver, Mr. Newell Arber, and Mr. A. C. Seward, and on May 3rd by Dr. D. H. Scott—after which others took part in a most spirited and illuminating debate.

Amongst important matters which have engaged the attention of your Council this Session, I may mention the arrangement under which we have undertaken to publish, with a certain amount of outside help, the series of Reports upon the Percy-Sladen Expedition to the western part of the Indian Ocean, under the leadership of Mr. Stanley Gardiner, in H.M. ship 'Sealark'; and also the Reports upon the Collections made by Mr. Cyril Crossland upon the Sudan Coast of the Red Sea. I consider it a natural thing that the results of biological exploring expeditions should come before the Linnean Society, and our publications in the past have contained several such series of Reports, which have been a credit to science and have enhanced the reputation of our Society. As examples, we may recall the series of papers on the Fauna of the Mergui Archipelago, in volumes 21 and 22 of the Zoological Journal, and the "Enumeration of the Chinese Flora," lately completed after a run of 20 years through volumes 23, 26, and 36 of the Botanical Journal.

To my mind, in undertaking such work we are performing an important function in Biology. The publication of the results of a great exploration, such as Mr. Stanley Gardiner's expedition down the Indian Ocean from Ceylon, through the Chagos Archipelago, Mauritius, Coctivy and various submerged banks to the

Seychelles, has undoubtedly been, would be creditable to any Society; and when that exploration is a biological one, dealing with land plants and marine algæ as well as with deep-sea animals, and with general problems of distribution and association and habitat such as concern both sides of our house, it is difficult to see what Society could more appropriately undertake the task than our own. The Sladen Trust has made a financial offer to our Council which will meet half the expenses of the publication, and we may look forward to receiving as Fellows a special series of about six extra volumes of our 'Transactions' devoted to the Fauna and Flora of the Indian Ocean.

Committees appointed by the Council are now deliberating on such important matters as Zoological Nomenclature, the destiny of the Wallichian Herbarium, and the form of our Publications—subjects of interest to all of us.

This review of some of the chief events of the Session will perhaps serve to show that the Linnean Society is still performing important functions in the advancement of Natural Science; and that your Council has its hands full of interesting work requiring careful attention.

In my Address last year I chose for some further remarks the historic connection between the production of artificial pearls and the great Linnæus, whose reputed birthday we commemorate at this Anniversary Meeting; and that enabled me to treat briefly of one side of the interesting biological process known as "pearl-formation." I propose on the present occasion to complete the subject, so far as I am able, by discussing briefly the other methods of pearl-formation apparently unknown to Linnæus.

I pointed out last year that "there are three main methods which have been advanced as explaining the formation of pearls; and, as is so often the case where there are several competing theories, it cannot be said that one only is correct and of universal application, and that the others are quite erroneous. The three I refer to are:—(1) the grain-of-sand irritation; (2) the pathological secretion; and (3) the stimulation caused by the presence of a parasitic worm, which acts as a nucleus around which an epithelial sac deposits successive layers of pearly material." I discussed sufficiently on that occasion the grain-of-sand theory, both as accounting for some pearls in Nature, and also in its application to the artificial pearls produced by Linnæus from the fresh-water mussels in Sweden. It may be that there is a future before such semi-artificial methods. If so, I am convinced that the process will consist essentially in pushing in before the inorganic nucleus a portion of the nacre-secreting ectoderm covering the mantle, so as to form an epithelial sac in which the pearl will be produced. But this method occurs rarely in Nature; and I now pass to the process of pearl-production which is stimulated by a parasitic worm, and which results in the finest Orient pearls. I shall not

recount again the early history of this discovery, but the Linnean Society may care to be reminded that the first in this country to connect Trematode parasites with pearls in mussels was one of our Fellows, Robert Garner, whose paper on the subject will be found in our Journal for 1871; and I may add that still earlier in the last century another of our Fellows, Dr. E. F. Kelaart, accounted for pearls in the Ceylon Pearl-Oyster by the presence of platyhelminthian worms.

Coming now to more recent work, especially during the last four or five years, we must examine the matter more minutely. The recent activity in this subject originated in France, and we associate with the investigations there the names of our Foreign Member Giard, of Dubois, Boutan, and Seurat. Giard had ascribed pearl-formation in the case of *Donax* and other Lamellibranchs to a Distomid worm, which he supposed to be a species of *Brachycoelium*, but has since identified as *Distomum constrictum*, Mehlis; when Dubois, in 1901, visited a mussel-bed, near Billiers (Morbihan) on the south coast of Brittany, which was known to be rich in pearls, and attributed the pearl-production to the presence of a Trematode larva which he named *Distomum margaritarum*. The next year, H. Lyster Jameson followed with a more detailed account of the relation existing between the pearls in *Mytilus edulis* and the Distomid larvæ, which he, like others, found, and which he identifies as belonging to the species *Distomum (Brachycoelium) somateria*, the same subgenus as Giard had found in *Donax* some years before. Jameson's observations were made first at Billiers, the locality where Dubois had worked, and partly at the Lancashire Sea-Fisheries Laboratory of Piel in the Barrow Channel. Dubois published a further note* in January 1903, by way of establishing his claim to have first made known the dependence of the pearls at Billiers upon the Distomid larva. In regard to the identification of the species of Trematode involved, Odhner has recently shown that Jameson's larval stages and his sexually mature form cannot belong to the same species, and that both belong to the genus *Gymnophallus*.

The adult, according to Odhner†, is *Gymnophallus somateriae* (Levinsen), and the larval form which causes the pearl-formation in *Mytilus* belongs to *Gymnophallus bursicola*, Odhner. In a still more recent paper‡ Lühe also refers Jameson's stages to different species of *Gymnophallus*, but considers it probable that the one causing the pearl-formation in the mussel is a distinct species which must be called *Gymnophallus margaritarum* (Dubois). Jameson's work may be said to have established quite clearly, if any doubt previously remained, that in our common marine mussel Trematodes are the parasites concerned in pearl-formation.

There are, however, two points which were left in a somewhat

* C. R. Acad. Sci. Jan. 19, 1903.

† Fauna Arctica, iv. 2, p. 291 (1905).

‡ 'Ueber die Entstehung der Perlen.'

unsatisfactory condition, viz.:—(1) the supposed transference of the parasite from another Molluscan host (*Tapes* or the Cockle) to the Mussel, and (2) the mode of origin of the epithelial sac which encloses the larval parasite and secretes the pearl. As I am discussing these two points in some detail in the forthcoming Part V. of my Ceylon Report, I shall not go into the matter here beyond saying that Jameson, although drawing attention to the similarity between the epithelium of the pearl-sac and that of the outer surface of the mantle, evidently considered that the two layers are not genetically related. He states definitely in regard to the pearl-sac, "this epithelium appears to arise quite independently of the outer epidermis." Boutan, in France, has written* controverting this independence, and contrasting Jameson's view of a mesodermal origin with his own view (which, I may add, I entirely agree with) that the two epithelia are genetically related, and that the pearl-sac must arise from the exactly similar cells of the ectoderm. It is highly probable that the parasite in burrowing into the mantle carries in with it one or more epidermal cells which proliferate to form the sac. As the Distomid larvæ are found moving on the inner surface of the shell before coming to rest in the mantle, they must traverse the epidermis, and it is natural to suppose that in their migration they may push some epidermal cells in before them. Even in the absence of direct evidence of this (and we have some evidence) it will be admitted that the process does not involve such a violent assumption as that the connective tissue in the centre of the mantle can produce an epithelial sac, the cells of which are indistinguishable both in structure and in function from the epidermis outside.

In order that I might make certain how far our views really differed, I thought it worth while lately to exchange letters on the matter with Dr. Jameson, who is now in charge of the Biological department of the Transvaal Technical Institute at Johannesburg; and his answer, received a week or two ago, contains the following passage, which he evidently wishes me to make public:—"I am very glad to have the opportunity of clearing up, through you, the uncertainty caused by my unintentionally ambiguous statements *re* origin of pearl-sac epithelium. I had never any doubt that it is a true epidermis, but I never got so far as to determine actually by observation whether it arose, as I think you have suggested, by the Trematode carrying in with it a fragment or pocket of epidermis; or, as I suspected, by means of epidermal or sub-epidermal replacement cells (*Ersatz-Zellen*) which are known to occur in many invertebrates, often in sub-epidermal tissues, and which replace epidermal cells if they are injured. I left the question open in my paper because I hoped to make some experiments on the nature of the epidermal cells; indeed, I had actually started these experiments when the temporary breakdown of my health necessitated my dropping the work, and as you know,

* Arch. Zool. Expér. sér. 4, t. ii. (1904).

since I came out here I have had no chance to continue my pearl-work."

From this it seems clear that Dr. Jameson would now agree with his critics (such as Boutan); and in fact I take it that all who are working on the subject are now agreed that the epithelium of the sac secreting the pearl must be derived, directly or indirectly, from the nacre-secreting ectoderm covering the outside of the mantle.

To return to the French investigators, Dubois, whose first observations were made in Brittany (1901), has since turned his attention to the Mediterranean Coast. He there finds that the Southern French Mussel (*Mytilus gallo-provincialis*) forms pearls caused by another species of Distomid. He then worked at the acclimatization of a true Oriental pearl-oyster ("pintadine") in French waters and the artificial production of pearls. He brought the pearl-oysters from the Gulf of Gabes in Tunis to the Marine Laboratory at Sfax, and caused them to multiply and increase in size. The pearls produced in Tunis are small and very rare—it is necessary to open 1200 to 1500 oysters to find one pearl; but Dubois tells us (C. R. 19 Oct. 1903, p. 611) that by placing them on ground where *Mytilus gallo-provincialis* becomes infested with pearls and parasites, he very easily provoked the production of fine pearls in the "pintadine" to such an extent that three successive individuals opened contained each two little pearls.

This, if corroborated, is a remarkable circumstance from several points of view. First, it will, if it proves a success, be a striking verification of what Kelaart in Ceylon, fifty years ago, declared might be done when he said—"It may yet be found possible to infect oysters in other beds with these worms, and thus increase the quantity of these gems." Secondly, if the "pintadine" in question is really the same species as the Ceylon Pearl-Oyster (Giard considers that it is not), it is curious that a Distomid parasite should prove to be so efficacious in setting up pearl-formation, since Mr. Hornell and I found that, in the Gulf of Manaar, the pearl-parasite is a Cestode larva. Thirdly, it is remarkable that the parasite of the *Mytilus* should transfer itself so readily to a new host belonging to a distinct family.

It is this last paper by Dubois that has given rise to various more or less exaggerated or even erroneous statements in the public press—such as that the pearl-oyster must be infected with a microscopic germ in order to render it pearl-producing; or even that inoculation with a serum causes the oyster to produce artificial pearls. The parasite that causes the irritation is, as has been known for many years, not a "germ," and still less a "serum," but a worm which is visible to the eye—a worm which in *Mytilus* seems to be usually a Trematode, and in the Ceylon Pearl-Oyster (*Margaritifera vulgaris*), according to Mr. Hornell's and my observations, is certainly a Cestode.

According to an interesting note by Prof. Giard *, the discovery of Cestode larvæ as nuclei of pearls, which we had made upon the Ceylon Pearl-Oyster in 1902, was shortly afterwards corroborated by Dr. L. G. Seurat, working independently in his Laboratory at Rikitea in the island of Mangareva (Gambier Archipelago). The oyster on which Seurat worked was *Margaritifera margaritifera*, var. *cumingi*, Reeve, and the Cestode parasite found is, according to Giard, an *Acrobothrium* (= *Cyathocephalus*) or some allied form. It is possible that some of our Ceylon Pearl-Oyster parasites may also belong to the genus *Cyathocephalus*, although most of them are certainly Tetrarhynchids.

Giard in a further note in the same Journal (p. 1225) discusses the statements that have been made in regard to "margarose artificielle," and evidently considers that Dubois's claim to have established the artificial production of pearls is not yet justified by the facts. Last of all Boutan † shows that "fine pearls" do not really differ from "nacre-pearls" since both are secreted from open or closed epithelial sacs derived from the epidermis; and Giard very properly replies a few days later ‡ that this fact is quite in accord with general principles, and was previously known. M. Boutan in a letter (20th Jan. 1904) states that he is on the point of departure for the East in order to investigate the matter further. But so far as I am aware, he has as yet made no further contribution to the subject.

In what I told you of Linnæus and pearls last year, the pearl-forming mollusc was a freshwater mussel of the genus *Unio*. In the greater part of what I have told you now of the recent investigations on the coasts of France and England, the molluscs in question belong to the genus *Mytilus*. But the pearl-formation in which I personally have taken most interest, and which is of the greatest importance to the pearl-merchant, is the Ceylon Pearl-Oyster belonging to the genus *Margaritifera*,—and to that I now pass.

I desire to pay passing tribute to the work of a pioneer. It was Dr. Kelaart who, in the Gulf of Manaar, half a century ago, first connected pearl-formation in a true pearl-oyster with the presence of Vermean parasites. In his 'Introductory Report on the Natural History of the Pearl-Oyster in Ceylon' (1857), after describing the secretion of nacre by the mantle, he said:—"It will be thus clearly understood that when a grain of sand or the larva of an insect is introduced between the mantle and shell, it will become covered over with the pearly secretion, which, always going on, is augmented at the part where the foreign matter lies. This phenomenon I have detected with the aid of the microscope in its very earliest stage." The probability is that by "larva of

* Comptes Rendus, Soc. Biol. Paris, 6 Nov. 1903, lv. p. 1222.

† Comptes Rendus Acad. Sci. 14 Dec. 1903, p. 1073; and also Arch. Zool. Exp. 1904.

‡ Comptes Rendus, Soc. Biol. Paris, 19 Dec. 1903, p. 1618.

an insect" in this passage Kelaart meant such an organism as the Cestode larva, which we now find is the determining cause of such pearl-formation. There are other passages on which there is not time to comment which show that Kelaart was tackling the problem in a scientific manner when his work on the subject was tragically interrupted by his sudden death in the Red Sea in 1859.

Thurston, in 1894, confirmed Kelaart so far as regards finding in the tissues and also in the alimentary canal of the Ceylon pearl-oyster the "larvæ of some Platyhelminthian (flat-worm)," but he was able to add little beyond figuring a couple of parasites encysted in the body. Here the matter practically rested so far as actual investigation of the Ceylon pearl-oyster was concerned, until Mr. Hornell and I found the Cestode larvæ in association with pearls in the liver and gonads during our cruises in the steamer 'Lady Havelock' in the Gulf of Manaar during February and March 1902. It was about March 6th, when cutting up oysters on the western part of the Cheval Paar, that we first became convinced that the opaque white globular larvæ we were finding encysted in the liver belonged to Cestode worms. Subsequent work showed us that some of them at least were referable to the genus *Tetrarhynchus*, and the various stages that we were able to find up to the spring of 1904 were described by Shipley and Hornell in the second volume of the Ceylon Report (p. 79). Since then large numbers of pearl-oysters from various localities in the Gulf of Manaar have been examined by Mr. Hornell in the field, and many parasites and small pearls from these oysters have been investigated by myself and my assistants in the laboratory. Although the work is by no means complete, we have come to certain definite conclusions, which will be published in the forthcoming fifth and last volume of the Ceylon Report (Royal Society, 1906).

The youngest stages in the life-history of our *Tetrarhynchus* are still unknown, and it is still uncertain whether some free-swimming larvæ caught in the tow-net on the Muttuvaratu Paar just over the infected oysters really belong to this life-history. They have calcareous corpuscles of the right appearance, and an indication of the invaginated anterior end which we find in our later stages, and they are almost certainly young Cestodes. One cannot add materially to the statement of Shipley and Hornell: "On the whole we think it probable that this larva is the first stage in the life-history of the pearl-forming organism." The next stages occur freely in the body of the pearl-oyster, where we find more or less globular larvæ of various sizes encysted in various parts of the body—the smaller ones mostly in the mantle and the gills, and larger ones in the liver and gonads and also sometimes in the mantle. In referring all these larvæ to the Cestoda we rely upon the following four characteristics:—

1. The invagination to form the head of the adult worm.
2. The hooks upon portions of the invaginated surface.

3. The calcareous corpuscles in the walls of the vesicle.
4. The division of the (? muscular) tissue in the floor of the invagination into several masses which probably represent bothria.

The possession of all these characters together definitely stamps the organisms as larval Cestodes.

The majority of these Cestode larvæ in the tissues of the Oyster do not die to become entombed in the costly sarcophagus which we know as a pearl. Probably it is only those that are provided with an ectodermal covering forming a pearl-sac that become sacrificed for the profit of man and adornment of women. The rest grow to some extent in the pearl-oyster, and then await, encysted in the tissues but alive, their legitimate further development in the next host when their sheltering mollusc is devoured by a fish. In such cysts and around such parasites we find no epithelial sac, and as a consequence there can be no deposition of pearly matter. Whether or not it is the case that only dead parasites supply the stimulus necessary to induce pearl-formation, and whether, as Giard has suggested, the parasites may be infested and killed by a species of the protozoon *Glugea*, so that that Sporozoon comes to be eventually responsible for the pearl, I am not yet prepared to say—the Ceylon material has yielded no fresh evidence bearing upon that point. It seems clear, however, that the epithelial sac is always associated with pearl-formation, and that, in the absence of the epithelium, only a thick-walled connective-tissue cyst is produced. If we adopt the view (stated above) that this epithelium is genetically related to the ectoderm, then a possible explanation of the difference in behaviour in the encysted condition would be that those larvæ that carried in ectodermal cells before they became covered (when dead or while still alive) by a pearl-sac and embedded in a pearl, while those that were free from ectoderm became surrounded by the connective-tissue cyst, and remained alive to perpetuate the race by reaching a final host.

In the first account I gave of these Ceylon parasites, it was suggested that the next stage after that found in the pearl-oyster occurred in a species of *Balistes* (which is sometimes found feeding on the oysters), and that the adult worm inhabited one of the large Elasmobranch fishes (Sting-Rays and Eagle-Rays) which frequent the Pearl Banks. Shipley has now identified as the adult of our *Tetra-rhynchus unionifactor* a parasite that we found in the Great Ray, *Rhinoptera javanica**, the "Walwadi tirikkai" of the Tamils, which is known to feed sometimes upon pearl-oysters and sometimes upon fish. No fresh light has been thrown upon the possible occurrence of an intermediate (late immature) stage in the *Balistes* (which eats the oysters and in its turn is eaten by the large rays); and although that intermediate host may not be absolutely necessary

* See the Section on Parasites by Shipley and Hornell in the forthcoming Part V. of the Ceylon Report.

to the life-history, since the rays also feed upon pearl-oysters, still there is nothing in the observed facts to forbid the existence of such a stage, and it is not unusual in Tetrarhynchids to have two fish-hosts, an intermediate Teleostean which is devoured by a final Elasmobranch.

The huge fish, then, which devastates our Pearl Banks is all-important in passing on to future generations of the oysters which it devours the parasite upon which pearl-production depends. No one knowing the facts could advocate the destruction or even the exclusion of this particular enemy of the pearl-oyster. If the rays increase much in number the beds of oysters will be decimated if not exterminated, and the pearl-fisheries ruined; and, on the other hand, if the rays are greatly reduced in number the parasites will be likewise reduced, and although the oysters may flourish they will have few pearls and the fisheries again will be ruined—so intricate and nicely balanced are sometimes the processes of Nature.

The further question then arises—Can we profitably follow up Kelaart's suggestion that it might be possible to increase the number of pearls by infecting the molluscs with the appropriate parasites? This "*Margarose artificielle*" has been tried, as we have shown above, by Dubois in a case where the parasite was supposed to migrate from one mollusc (a *Mytilus*) to another of a different genus (*Margaritifera*). Giard and others have pointed out the difficulties in the way of accepting this case and the doubts that naturally arise, and we are probably correct in concluding that the method has not as yet resulted in a marked success on the southern coast of France; although it is quite possible that similar methods with other shell-fish elsewhere may give good results.

On the Ceylon pearl-banks, however, it is probably quite unnecessary under present conditions to take any steps to ensure infection with the appropriate parasite. Oysters wherever they appear, when they are old enough, contain pearls, and encysted parasites are even more abundant. Even when new beds are formed artificially by transplanting to unoccupied ground, as we do not doubt will be the case in the future, this may be done with perfect confidence that when the four-year-old oyster is fished it will contain the normal* supply of pearls. The parasites are probably so widely spread that every pearl-oyster in the Gulf of Manaar, or for that matter around the coast of Ceylon, runs a fair chance of becoming infected. Cyst-pearls are found in the oysters at Trincomalee; the fishes that are, in all probability, the hosts of the parasite in its more advanced stages also abound at various points. It is the molluscan host, and not the parasite, that stands in need of artificial aid in Ceylon. If we can increase

* Of course, some beds are richer in pearls than others and some years are better than others.

the number of beds, and can prevent catastrophes from devastating the oyster-populations, so that the divers can collect the spoil annually in their tens of millions, we need not fear any scarcity of pearls.

As Boutan, who thinks favourably of artificial methods, points out*: “Mais il ne faut pas oublier que l’infection d’un animal par un parasite ne favorise pas précisément le développement normal du sujet infesté.” He advocates as an alternative method experimental trepanning of the shell, but that or any other mode of individual treatment is clearly impracticable in dealing with the millions of the Ceylon pearl-banks. My own opinion is that, although all pearl-production is a departure from the normal, the pearl-inducing parasites are not sufficiently abundant to affect seriously the health of the oyster; and that, to reverse the popular saying, if we attend to the prosperity of the bed as a whole, the individual oysters may be left to take care of themselves, both in regard to health and pearl-production.

I quoted last year Linnæus’s statement, made in connection with his process of artificial pearl-formation:—“As all the knacks of Nature are very simple, so is this when properly hit upon.” It was certainly much simpler† than the “knack of Nature” I have just discussed, requiring a parasitic worm and several successive hosts, which we now believe is necessary to produce the finest Oriental pearls. And although I hope we have now “properly hit upon” this “knack of Nature,” I do not for a moment suppose that the subject is exhausted. There is still much to be investigated. Mr. Hornell, another Fellow of our Society, is now Inspector of Pearl Banks to the Ceylon Government, and is ably carrying on the work commenced in the Gulf of Manaar fifty years ago by our former Fellow, Dr. Kelaart.

Altogether, I think we may feel that the Linnean Society has played a not unimportant part in the investigation of the connection between parasites and pearl-formation; and that therefore, perhaps, it is not inappropriate that one of your Anniversary Addresses should have been devoted to that subject.

Mr. HENRY GROVES moved:—That the President be thanked for his excellent Address, and that he be requested to allow it to be printed and circulated amongst the Fellows—which, after being seconded by Dr. Maxwell T. Masters, was put and carried unanimously.

* Arch. Zool. Expér. 1904, p. 89.

† In the sixth edition of the ‘Systema Naturæ’ (1746), p. 195, Linnæus gives the following definition of a pearl:—“Calculus testæ concharum. Margarita, Unio. Locus: Testæ excrescentia latere interiore, dum exterius latus perforatur”—which is certainly simple enough.

The ballots for Council and Officers having been closed at the times laid down in the Bye-Laws, the President appointed Mr. G. S. Saunders, Mr. Henry Groves, and the Rev. R. Ashington Bullen to be Scrutineers for both ballots; and the votes having been examined, the Scrutineers reported to the President, who thereupon declared the result as follows:—

For the Council:—R. ASSHETON, M.A., V. H. BLACKMAN, M.A., Dr. GILBERT C. BOURNE, Dr. HORACE T. BROWN, F.R.S., *Prof. ARTHUR DENDY, Rev. CANON FOWLER, M.A., Prof. W. A. HERDMAN, F.R.S., B. DAYDON JACKSON, Esq., HORACE W. MONCKTON, F.G.S., Prof. F. W. OLIVER, F.R.S., *Prof. E. B. POULTON, F.R.S., *Lt.-Col. D. PRAIN, F.R.S., CLEMENT REID, F.R.S., Dr. A. B. RENDLE, M.A., *Miss ETHEL SARGANT, Dr. DUKINFELD H. SCOTT, F.R.S., *ARTHUR EVERETT SHIPLEY, F.R.S., Dr. OTTO STAFF, Rev. T. R. R. STEBBING, M.A., F.R.S., and Dr. A. SMITH WOODWARD, F.R.S.

The new Councillors are denoted by a star prefixed; the five retiring Councillors being: FRANK CRISP, LL.B., C. B. CLARKE, F.R.S., Prof. J. B. FARMER, F.R.S., Dr. W. G. RIDWOOD, and D. SHARP, F.R.S.

The ballot for the Officers was declared as follows:—

President: Prof. W. A. HERDMAN, F.R.S.

Treasurer: HORACE W. MONCKTON, F.G.S.

Secretaries { Dr. D. H. SCOTT, M.A., F.R.S.
Rev. T. R. R. STEBBING, M.A., F.R.S.
B. DAYDON JACKSON.

The PRESIDENT then addressing the Rev. Canon NORMAN, F.R.S., said:—

“Canon Norman,—It gives me peculiar pleasure, on the present occasion, to be the mouthpiece of the Linnean Society. The Council has selected you this year as the recipient of the highest honour at their disposal—the award of the Linnean Medal. You will be gratified, I know, when you think of the list of distinguished botanists and zoologists who have preceded you as Medallists, and we are gratified at being able to add your honoured name to that illustrious list.

“In your presence I find it difficult to say all that I might as to those high claims to the distinction which the Council recognised in making the award; but it is customary to make such a statement, and I may therefore be permitted to remind those who hear me now, and those who read of this Meeting in our ‘Proceedings’ hereafter, that we honour in our Medallist a naturalist who has probably done more than any other man living to make known to Science the Invertebrate Fauna of the seas of North-West Europe.

His name occurs as the discoverer or the recorder of rare and interesting marine animals in nearly every faunistic text-book and monograph from 1852 onwards. For more than half-a-century Dr. Norman has been indefatigable in collecting and in elucidating the British species of Crustacea and other Invertebrata; and the many parts of the 'Museum Normanianum' form a record of a vast collection which has ever been at the service of scientific workers both at home and abroad. Bate and Westwood, in their work on 'British Sessile-eyed Crustacea,' make acknowledgments to the Rev. A. M. Norman, 'who has forwarded to us his entire collection of Edriophthalmatous Crustacea for examination'—and that is only one of many similar instances. Haeckel, Bowerbank, H. B. Brady, G. S. Brady, Hincks, M'Intosh, Bonnier, Canu, Alder and Hancock, Haddon, Jeffrey Bell, Della Valle, P. Mayer, and Giesbrecht are some of the eminent marine zoologists who acknowledge in their publications the help freely given by our Medallist.

"Norman's own scientific writings are numerous, extending from 1851 to 1906; and his wide scope is indicated by the Shetland Dredging Report to the British Association in 1868, 'On the Crustacea, Tunicata, Polyzoa, Echinodermata, Actinozoa, Hydrozoa, and Porifera.' Bowerbank, at that date, naming a new genus of sponges *Normania*, says: 'I have named this genus after my friend the Rev. Alfred Merle Norman, the ardent and accomplished naturalist, to whom I am indebted for numerous new and valuable species of British Sponges.' This compliment Norman amply repaid in 1882 by completing Dr. Bowerbank's unfinished work on the British Sponges for the Ray Society.

"A genus *Normania* was named by G. S. Brady among the Ostracoda in 1866; and it may be noted that under the dates 1889 and 1896 Brady and Norman are found collaborating in an important monograph on the Ostracoda, published by the Royal Dublin Society. That in 1871 Axel Boeck named a genus of Amphipods *Normania* (now *Normanion*, Bonnier) is only one more evidence of our Medallist's varied activity. I cannot refer to all his papers: they include useful faunistic lists from different parts of the country, records of dredging expeditions in the North Sea and elsewhere. In the Zoological Society's 'Transactions' for 1886 will be found his joint paper with Mr. Stebbing on the Crustacea Isopoda of the 'Lightning,' 'Porcupine,' and 'Valorous' expeditions.

"His definition of the 'British Area in Marine Zoology,' issued in 1890, has been generally accepted. At the same date he published a valuable 'Revision of British Mollusca,' worthy of a sometime President of the Conchological Society. His 'Month on the Trondhjem Fiord' in the 'Annals and Magazine of Natural History' for 1893 to 1895, followed more recently by his 'Notes on the Natural History of East Finmark' in the same Journal for 1902-05, could only have been written by a Field-Naturalist of

very extensive experience and knowledge. The vigour and acuteness of research displayed in the memoir on *Splanchnotrophus* by Hancock and Norman, read before this Society in 1862, are equally prominent in the volume by Norman and Scott on the Crustacea of Devon and Cornwall, published a few weeks ago.

"Besides his own meritorious studies in those branches of Natural History in which this Society has always taken an exceptional interest, Dr. Norman has even wider and more general claims on our gratitude and regard. He has ever been ready and eager to encourage beginners in Science. He has cultivated the friendliest intercourse with the eminent naturalists of other nations. His co-operation with French zoologists in the cruises of the 'Talisman' and the 'Travailleur' in the Gulf of Gascony, on the invitation of the French Government, is well known, and was highly appreciated by his fellow-workers. He has received from the 'Institut' of France the medal struck in honour of the expeditions. Thus he has been continually a referee open to appeal for information and advice, whether demanded of him by the humblest worker or the proudest Government.

"These, Dr. Norman, are some of the considerations that have influenced the Council in awarding to you this Linnean Medal, which they hope you will accept as an indication of their high appreciation of your services to Marine Zoology in general and to Carcinology in particular—services which we hope may be continued for years to come."

The recipient made a reply expressing his gratification at the award.

The General Secretary having laid before the meeting the Obituary Notices of Fellows, the meeting terminated.

OBITUARY NOTICES.

JOHN BRIDGOOD died at Bournemouth on 6th October, 1905, from blood poisoning, in his fifty-third year, and was buried at Gateshead on the 10th October. At the time of his death he was head of the Secondary School at Gateshead-upon-Tyne. He was an enthusiastic botanist and geologist, and of late years he had given much attention to colour in flowers, especially in Orchids, on which he had written and lectured. He was elected Fellow, 6th March, 1889.

GEORGE BOWDLER BUCKTON (1818-1905).—Among other losses of last year, the Linnean Society has to record that of one of its oldest members, and one who served on its Council, 1855-56. On September 25th, 1905, at the ripe age of eighty-seven, George Bowdler Buckton, F.R.S., F.L.S., F.C.S., F.E.S., &c., passed away, "leaving behind him," to use the words of Sir William

Huggins, "the deep grief of a large circle of friends, and a noble example of unwearied devotion to the successful prosecution of scientific work, notwithstanding great physical infirmity."

Born in London, May 24th, 1818, and brought up at Oakfield, Highgate, G. B. Buckton was the eldest son of a large family, his father, George Buckton, being Proctor of the Prerogative Court of Canterbury, and his mother, Eliza, the daughter of Richard Merricks, Chichester, Deputy-Lieutenant of the County of Sussex.

About the age of five years, Buckton sustained an accident which crippled him for life, a misfortune which he always bore with courage and silence, but which a man of his strong build and active temperament must have felt acutely. Unfitted thus for public school and University life, he was educated by the Rev. Oliver Lodge, Rector of Barking, and the Rev. D. Meuse, formerly head-master of the Cholmondeley School, Highgate. Popular with his class-mates, he shared their escapades, and was often carried "pick-a-back" by some strong fellow on daring excursions.

Left a good deal to himself, he became a fair classical scholar, and read widely. He showed a marked taste for music and painting, which remained his favourite pleasures to the end of his life. He evinced also remarkable powers of inventive construction in illustrating his youthful lectures on scientific subjects.

While scarcely more than a boy he made the acquaintance of Thomas Bell, who lived at Hornsey, and became his close friend for more than forty years. Stimulated by Prof. Bell, he became an earnest student of natural history. With a pony he roamed the Highgate Woods and their neighbourhood, and made careful and very complete collections of bees, shells, butterflies, and birds; most of the latter he shot and prepared with his own hands. He became also a good fisherman, and visited the rivers of Scotland and of Ireland. Always keenly alive to the interest of allied issues, his enjoyment of works on astronomy led him, quite early, to grind telescopic specula. Frankland, with whom he afterwards became intimate, vied with him in being the first to produce specula on glass, which method had been lately invented by the French philosopher, Foucault. Subsequently he worked specula of 12 inches diameter, and, as an amateur, mounted these equatorially.

When, on the death of his father, he moved into London, he built a circular observatory on the leads of his house, and made and mounted more than one telescope. It was about this time that he became the pupil, friend, and assistant of Professor A. Hofmann at the Royal College of Chemistry. His first recorded scientific paper was "Observations on the deportment of Diplatosmine with Cyanogen," which was published by the Chemical Society, 1852, and translated into French and German periodicals. A succession of other papers followed, notably one on his discovery and isolation of the radical Mercuric Methyl (Royal Society's 'Proceedings,' 1857). The last of the series, worked out with the collaboration of William Odling, was upon Aluminium Compounds,

and was published in the Royal Society's 'Proceedings,' 1865. A list will be found in that Society's Catalogue of Scientific Papers, which however omits his paper in the 'Zoologist,' xiv. 1854, pp. 436-438, on Cyanide of Potassium for killing insects.

It was on December 16th, 1845, that Buckton became a Fellow of the Linnean Society, coming into contact with Yarrell, Westwood, Wilson Saunders, Owen, Huxley, the Hookers, and other naturalists, and contributions from his pen are to be found in our Proceedings, Journals, and Transactions.

In 1852 he was made a Fellow of the Chemical Society; and in 1857 was elected to the Royal Society, becoming a member of the Philosophical Club of that Society, whose meetings he attended with great interest (in spite of the effort any journey entailed) till extreme old age compelled him to relinquish them. In 1883 he became a member of the Entomological Society; and later of the Entomological Society of France, and of the Academy of Natural Sciences, Philadelphia.

In 1865 Buckton married Mary Ann, the only sister of his friend Professor W. Odling of Oxford. He purchased the estate of Weycombe, Haslemere, Surrey, then a rural village, where he built himself a stone-gabled house, according to his own designs, taking with him his observatory and transit instruments. Here he lived for the remainder of his peaceful and happy married life. Of his eight children, five daughters and a son are still living.

From this time, though he kept his chemical laboratory and laboratory and gave private lectures to his children and his friends, he devoted himself to Natural History, beginning with a study of the Parthenogenesis of Aphides, which resulted in four volumes on British Aphides for the Ray Society, 1876-1883, with profuse illustrations made under the *camera lucida*, which he lithographed on blocks of stone and coloured with his own hand. This was the first of his valuable series of Entomological monographs relating chiefly to the obscure and somewhat neglected suborder Homoptera. In 1890 he published his Monograph of British Cicadæ, or Tettigidæ (2 vols., Macmillan), in which he was helped by his children, who collected specimens and worked at the colouring of many of the plates. This was followed by the 'Natural History of *Eristalis tenax*, or the Drone-fly' (published by Macmillan, 1895), and finally by a large and important work on the Membracidæ of the World (Lovell Reeve & Co., 1901-1903), the Supplement to which, with many drawings, was finished for the Transactions of the Linnean Society only two months before the author's death. The original plates of the Monograph have been presented to the Hope Museum, Oxford. His lightness of hand in setting his many hundred slides was remarkable. Often in laying out the delicate nervous organisation of an insect, he would take for the purpose the sting of a wasp, as the finest procurable tool.

Various societies and museums, abroad and in the colonies, were in communication with him, and he had a wide correspondence.

There was a dignity and unconscious charm even in his business letters that one associates with another generation, the simplest reply communicating the touch of a rare and genial personality.

Until they were nine and ten years of age Buckton taught his own children in various subjects, from grammar and languages to Euclid, drawing, and physiology. He had an unusual gift of exposition, and was ever ready to share his knowledge with others. His humility and simplicity made him one to be easily approached, and he gave often his tools and specimens to small boys who showed an interest in natural history. The story is still told of the stonemason who stopped him in his pony-carriage in the village street, to ask the cause of the colours in the rainbow. One writes: "None who ever met him could fail to be struck with his kindly courtesy, his intense vitality, his wide range of knowledge, and his unflagging interest in every topic affecting mankind." In spite of his physical disabilities he travelled in Italy, France, and elsewhere, ascended Vesuvius, saw the Commune in Paris, and climbed the barricades, his great will-power enabling him to surmount difficulties that would have daunted many.

The visits to the observatory, which was built in his garden some way from the house, were abandoned after a serious accident which befel him in the autumn of 1882, when he overbalanced himself in reaching the long focus of a Newtonian. He lay with a double-fractured leg for some hours before he was found; but his recovery, though slow, was complete.

In politics a Conservative, he interested himself in all sorts of public matters, acting as treasurer and chairman on various local bodies. He was a moderate Churchman with broad sympathies, and gave liberally to Church and schools. Among his large circle of friends he numbered many of eminence, among them Tyndall and Tennyson, of whom he saw a good deal. "Though sometimes swift and uncompromising in his judgments, and of a quick temper, he was withal of a significant self-control, especially as regards his physical difficulties. Those most intimately associated with him have no single remembrance of moodiness or murmuring. Rather is their recollection, when some unexpected hindrance presented itself, of a lightly sad, resigned, half-humorous reference to his disability, a reference not easily forgotten by those who heard it." One has said that the most striking thing about him was his "magnificent calm." He kept his powers to the last. The fine and picturesque bust exhibited of him by R. Hope-Pinker in the Academy of 1904, showed how little age had impaired his clear intellect and vigour. He was finishing some water-colour sketches of Norway within a few weeks of his death. The end was the natural end of old age. After three weeks' suffering and illness following a chill, conscious to the last, his spirit passed peacefully, on the night of September 25th, 1905, surrounded by his wife and his children.

"Truly a devoted, spiritual, knightly nature," writes the present

Lord Tennyson, "with a faith as clear as the height of the pure blue heaven. His views and my father's, upon life, death, and immortality, were very much alike. My father always used to say, 'My most passionate and earnest desire is to have a fuller and clearer knowledge of God.'"

There is scarcely a preface to any of his larger works where Buckton does not incidentally reveal his deep-lying interest and trust in "things unseen."

The urn with the ashes, after cremation, was buried, according to his wish, in Haslemere churchyard, in the presence of many friends and representatives of the various societies to which he belonged, the subdued festivity of the place, which was keeping its harvest home, adding to the calm and beauty of a somewhat unusual ceremony. [* * *]

The death of Mr. THOMAS CHRISTY, which took place on 7th September, 1905, removes from us a very constant attendant at our meetings, and for many years a very frequent exhibitor. He was born of an old Quaker family on the 9th December, 1832, and was thus in his seventy-third year at the time of his decease. Early in his business career he went to China, and was there associated with Sir Thomas Hanbury, and whilst engaged in his produce and drug business he corresponded with Daniel Hanbury and other leading pharmacologists. Returning to London in the early sixties, he established himself as an importer and merchant in drugs, distinguishing himself by the introduction of *Strophanthus* and menthol. In addition to his special catalogues, he from time to time published a part of his 'New Commercial Plants and Drugs,' of which twelve parts appeared from 1878 to 1897. He was an enthusiastic believer in ensilage, and in 1897 issued a pamphlet on the system. For much of the scientific information contained in these publications he depended upon specialists whom he induced to work with him. Many of the plants thus introduced by him were cultivated in his garden, first at Sydenham, afterwards at Wallington. One of the last matters which engaged his attention was the so-called "grass-rubber" or "root-rubber," *Landolphia Tholloni*, from the Congo. His connection with this Society dated from 21st December, 1876, and he served on the Council from 1883 to 1886. He was buried at Wallington, Surrey, on 11th September last. [B. D. J.]

The death of the Rev. JAMES MORRISON CROMBIE removes from our roll one who bore his share in the work of the Society nearly a generation ago. He was born in Aberdeen, where he was baptised 20th April, 1830; on leaving school at the age of fifteen he entered at Marischal College, in the University of his native town, thence going up to Edinburgh, where he took his degree of M.A. Prof. Macgillivray, his first instructor in natural science, wrote of him: "He

has in all respects been one of the best students I have ever had under my charge, and will yet distinguish himself as a botanist." In a clerical capacity he was first licensee in Edinburgh in the Established Church of Scotland in 1858, and was ordained a minister of that communion in 1862. His first essay in natural history was his small volume, 'Braemar, its Topography and Natural History,' Aberdeen, 1861, 8vo. This was written during his probation at Castleton; later he was stationed at North Leith, before he came to London as assistant to Dr. John Cumming. He had a ministerial charge at Swallow Street, Piccadilly; and on its sale, served for many years as an acting-chaplain to the forces at Aldershot.

In spite of these claims upon his time he managed to engage in botanic work, especially devoting himself to lichenology, in which branch he published his first paper in the 'Journal of Botany' for 1869, in three parts, entitled "New British Lichens," many of which were described from his own collecting. He was at this time an indefatigable pedestrian, and would even pass the night among the heather, in order to get at plants he wanted; though most averse to trade collectors, with whom he sometimes had warm disputes in the wilder districts. In the next year he brought out a manual for British lichenologists, namely, 'Lichenes britannici, seu lichenum in Anglia, Scotia et Hibernia vigentium enumeratio,' Londini, 1870. From this time onward to 1893 Crombie published many papers on his favourite study, in which he ranged himself with Nylander, and against the symbiotic nature of the lichen. He described many novelties from the Arctic and Antarctic regions, and investigated *de novo* the lichens of Dillenius and of Withering. For the Trustees of the British Museum he undertook an enumeration of the British Lichens in the Department of Botany, of which the first volume came out in 1894 as 'A Monograph of the Lichens found in Britain,' &c., but the second volume was not completed in the author's lifetime. He was elected a Fellow of the Linnean Society, 6th May, 1868, and served on the Council from 1879 to 1882; in 1879 also he became Lecturer on Botany at St. Mary's Hospital Medical School till 1891. Shortly after his retirement from this lectureship he removed to Ewhurst, Surrey, and there quietly lived till his death on 12th May, 1906.

His herbarium is now at the British Museum (Natural History).
[B. D. J.]

The Right Hon. Sir MOUNTSTUART ELPHINSTONE GRANT DUFF, G.C.S.I., was the son of James Cunningham Grant Duff, the author of the 'History of the Mahrattas,' and Jane Catherine, the only child of Sir Whitelaw Ainslie, author of the 'Materia Medica of Hindostan,' published at Madras in 1813, and recast in two volumes, London, 1826. He was born at Eden, Aberdeenshire, 21st February, 1829, received his education successively at

Edinburgh Academy, the Grange, Bishop Wearmouth, and Balliol College, Oxford, where he took a second class in 1850, and was called to the Bar in 1854, of the Inner Temple. He declared that "the chief interests of his life were politics and administration," of which abundance fell to his share. He represented the Elgin Burghs in Parliament from 1857 to 1881, and held office as Under-Secretary of State for India, 1868-1874; Under-Secretary for the Colonies, 1880-81, which post he quitted to become Governor of Madras, which he held for five years to 1886. Connected as he was on both father's and mother's sides with India, this appointment was congenial. He had previously been Lord Rector of Aberdeen University, 1866-69, and after his return to England he was President of the Royal Geographical Society, 1889-93, of the Royal Historical Society, 1892-99, a Trustee of the British Museum from 1903, and a Member of the Senate of London University from 1891. Amongst these varied scenes he mingled with the best informed people, which furnished him with material for his fourteen volumes of 'Notes,' embracing a period of fifty years, from the time of his taking his degree to the First Council of King Edward VII. Besides three or four political works, he wrote three memoirs—of Sir Henry Maine (1892), Ernest Renan (1893), and an appreciative notice of the fourth Baron de Tabley, which was prefixed to that nobleman's posthumous 'Flora of Cheshire,' in 1899. He described his recreations as "fencing, botanising, travelling, conversation."

In 1859 he married Anna Julia, only daughter of Edward Webster, Ealing, by whom he had four sons and as many daughters. He was elected into our Society 18th April, 1872, and in 1881 also into the Royal Society. He died on 12th January, 1906.

[B. D. J.]

The Hon. CHARLES ARTHUR ELLIS was born at Lisbon in December 1839. He was the third son of Lord Howard de Walden, the sixth Baron and a distinguished diplomatist who represented Great Britain as Minister in Lisbon and Brussels, at which places Charles passed the first years of his life. He received his education at Harrow, and after having graduated at Balliol College, Oxford, he qualified as a barrister of the Inner Temple. From an early age he showed great fondness for Natural History; without entering into a methodical study of the subject, he cultivated it by reading, collecting and keeping every kind of living animals for the purpose of observing their habits. Of sport he saw and enjoyed as much as a man can desire, but this home experience as a sportsman only served him as an apprenticeship for the travels and expeditions which he undertook in the desire to see wild nature in her grandest and purest aspects. In 1861-62 he paid his first visit to Canada and the United States under exceptionally favourable conditions. A friend of his father's, Admiral E. W. Vansittart, who com-

manded at the time the 'Ariadne' which escorted H.R.H. the Prince of Wales on his visit to America, invited Ellis to be his guest on the occasion. During the progress of the Prince's visit, Ellis remained attached to the retinue, seeing in a short time more of the country than would have been possible to him, if he had travelled by himself, and preparing himself for other visits which he made in subsequent years and which he extended into many parts of the Far West. The object of these later visits was mainly sport with rod and gun, and several seasons were devoted to the big game of the Rocky Mountains; he travelled southwards into Mexico and British Guiana, attempting even the ascent of Roraima, a feat accomplished many years later by Im Thurn.

The accounts of the wonderful success of sportsmen in South Africa induced him to undertake an expedition into that continent. Having secured the goodwill and assistance of a professional hunter, John Dunn, who enjoyed the special favour of the Zulu King, he was able to penetrate into, and shoot in parts of the country which were closed to the majority of travellers, and, therefore, still teeming with every variety of big game. On this expedition he met with a serious accident, as far as his friends know, the only one that befel him during his wanderings. A crocodile seized him by the leg inflicting dangerous wounds, by which he was kept for six weeks a close prisoner in a Kaffir kraal.

On the invitation of Lord Dufferin, then Governor-General and Viceroy of Canada, he fished in 1879 the Grand Cascapedia River, Bay of Chaleur, in the Province of Quebec, having for his companions Mr. L. Iveson and Captain G. A. Percy. An idea of the abundance of fish in that river at that time may be gathered from the record kept by Ellis of that expedition. Between June 19th and August 14th he fished on 44 days, during which he caught to his own rod 269 salmon of an aggregate weight of 6714 pounds; 53 weighed between 30 and 44 pounds.

In 1882 he visited India and organized an expedition into Eastern Turkestan; travelling by the usual route through Cashmere and Leh, and spending the winter in Yarkand and Kashgar. During this expedition he had an opportunity of releasing a Punjabi trader from an embarrassing situation; and from a sense of gratitude, this man not only kept up a correspondence with Ellis after his return to England, but also sent him a series of some thirty heads of *Ovis poli*, such as is not likely to be ever brought together again. On his journey home Ellis visited Japan, some of the South Sea Islands, and New Zealand, without making a protracted stay in any of these countries.

After his return to England he gradually laid aside gun and rod, and finally selected Surrey for his residence. In the charming neighbourhood of Haslemere he built Frensham Hall, a

commodious house, in which he could find room for the numerous trophies, and other objects of interest which he had collected during his wanderings, and to which many reminiscences of his life were attached. It was among them that his friends had an opportunity of learning something of his experiences in foreign countries. Pictures, chiefly of Mammals, Birds, and Fishes—among them many originals by Joseph Wolf—adorned the walls. The surroundings of the house, which is situated on the top of a ridge, the well-wooded slope and the plantations of the valley were devoted to the cultivation of an immense variety of hardy plants; a collection of ligneous plants was an object of his special care and attention. Ellis did not care about plants or animals which would have to be kept under artificial conditions or in confinement. But in the well-watered low-lying part of his grounds he had constructed a series of ponds for the acclimatization of such species of Fishes, Frogs, and Tortoises as might be expected to thrive in our climate. The continent of Europe and North America supplied most of the species of the Frensham Colony; he obtained large consignments of Bull-frogs, Tree-frogs, Freshwater Turtles, and for the last five years he had the pleasure of seeing the majority sufficiently well established and regularly breeding in his ponds. The progress of the growth of his plantations and the observation of the habits of his aquatic animals were a never-failing source of delight to him, and the correspondence with his friends teems with valuable hints and interesting facts.

He joined the Society on 18th February, 1897, and was one of the generous donors enabling the Society to acquire the Swainson correspondence. He was not married, and died on the 30th March, 1906. [A. G.]

FREDERICK JOHN HORNIMAN died on the 5th March, 1906, at Falmouth House, Hyde Park Terrace, London, in his 71st year. He was a native of Bridgewater, Somerset, where he was born on the 8th October, 1835, and was educated at the Friends' College, Croydon. He entered into business as partner in the well-known firm of W. H. & F. J. Horniman, which afterwards was made into a company. Throughout his life he collected largely and travelled widely, visiting North America, China and Japan, Ceylon, Burma, and British India.

His collections were gathered into a Museum, which in 1901 was presented by him to the London County Council in trust as a public museum; the gift was stated to have cost the donor £40,000. He sat for the boroughs of Penryn and Falmouth as a Liberal from 1895 till the recent dissolution, when failing strength determined his retirement. He was elected a Fellow of this Society 2nd March, 1896, and belonged also to the Royal Geographical, Zoological, and other societies. He was twice married, and left an only son, who was returned to Parliament for Chelsea last January, thus preserving the connection of his family with the House of Commons. [B. D. J.]

RUDOLPH ALBERT VON KOELLIKER was born at Zürich in Switzerland on the 6th of July, 1817. Before his death, on the 2nd of November, 1905, he had become Geheimrat Prof. Dr. Rudolph Albert von Koelliker. His long life was filled with science. But just as a caisson may be filled with cannon balls and yet have room for bullets and shot, so Koelliker found means to dovetail in with intellectual pursuits many other activities. His ambition did not need to spurn delights, while he was living laborious days. From boyhood to old age he rejoiced in every sort of athletic exercise. His agreeable "Reminiscences," published in 1899, diversify the details of anatomical research with glimpses of his exploits and powers of endurance in skating, swimming, riding, mountaineering, and chamois hunting. He attributes in part his vigorous health to this constant indulgence in outdoor pursuits. It is just possible, however, that the vigorous health made the indulgence possible, rather than resulted from it. On one of his early voyages he was able to resist a strong temptation to be sea-sick, and celebrates this as a victory of mind over matter. On a subsequent occasion the tumbling waves were too much even for his resolution. He does not in this case point any moral as to the victory of matter over mind, but it is creditable to his fairness that he reports the circumstance. His candour is manifested at several points. For example, in 1845, as our Proceedings show, he adopted the current opinion, and argued against Costa that the *hectocotylus-arma* of the Octopoda was an independent organism. Fifty-four years later he calls this mistake to mind. Be the excuses what they might, he can scarcely forgive himself for it, and speaks of it as a still gnawing worm. In the course of his career he had so many successes and received so many distinctions, that a few errors and disappointments help to humanise the picture. At the age of twenty-seven he became a professor in his native town, and would fain have remained there. But the home authorities were insufficiently awake to the claims of his budding renown, so that at thirty he reluctantly accepted an invitation to Würzburg, with the result that its university profited for more than half a century by his valuable and steadfastly loyal service.

It is pleasant to reflect that at every stage of his public life the genius of Koelliker met with appreciation in Great Britain. So early as 1853 his 'Manual of Human Histology' was translated into English by Busk and Huxley. He was elected a Foreign Member of the Linnean Society in 1858, and was awarded the Linnean medal in 1902. Our Proceedings for the latter year contain the eloquent eulogium passed upon him by Professor Vines, then president. From the Royal Society he received the Copley medal in 1897. He had been one of its Foreign Members since 1860, and delivered the Croonian lecture before it in 1862. In 1889 he took part in the 'Challenger' reports, contributing a Monograph on the Pennatulidæ, and utilising the opportunity to introduce a new classification of that group.

Koelliker's visits to our Island were frequent, and from the outset, while he was quite a young professor, he was received with a distinguished welcome. This was in great measure due to the Pacinian corpuscles. Koelliker, it should be explained, after having been a favourite pupil of Henle, began his official life as prosecutor to that eminent anatomist at Zürich. In this employment he happened one day to be examining the intestine of a cat for lymphatic vessels, when his attention was caught by some peculiar bodies with a pearly lustre. These he showed to Henle, who examined them with him under the microscope, and said at once that such bodies were described in a work he had just received from the Italian anatomist Pacini. The professor and his prosecutor then in amicable concert examined these organs in man and a series of other animals, and gave the first exact description of them, after discovering in them the nerves which Pacini had not seen, a success which is described as easy in the case of the cat, but more difficult in the human subject. Their joint treatise appeared in 1844. In the following year Koelliker, now himself a professor, journeyed to London. He sums up his stay there as "very interesting, often pleasant, but on the whole very fatiguing." The fact was that he compressed into a few weeks the sight-seeing and experiences which perhaps not many Londoners compass in a lifetime. He was taken about not only to museums, but to docks, exchanges, warehouses, bazaars, galleries, gardens, and country-houses. It rained invitations to the breakfasts, which were in that day fashionable, and to dinners which at that epoch lasted, he says, from six o'clock to eleven! With these engagements were intermingled soirées scientific and social, dances at Almack's and elsewhere, and a presentation at Court. Amid this whirl of amusement he carried out the principal object of his journey, which was to have intercourse with all our most prominent men of science. They gave him a ready and genial reception, even the jealous reserve of Owen being in this instance overcome. In colloquies on matters of professional interest and in demonstrations with the microscope, it is clear that the visitor and his hosts found reciprocal and appreciative satisfaction.

On Koelliker's services as one of the chief pioneers in the modern development of microscopical and microtomeal investigation, as an ingenious, active, and inspiring teacher, as a luminous writer on histology and many other branches of comparative anatomy, it is unnecessary to enlarge. It may be of interest here to give, as nearly as may be in his own words, the summary of his views on the doctrine of descent. He insists that the process of inheritance can only be understood through the phenomena of generation. The generating organisms transmit to the generated a morphologically definite substance of typical composition, on whose operations the whole conformation of the generated offspring depends. This heritable matter (Nägeli's *idioplasma*) is contained in the germinal vesicles of eggs and in

the sperm-threads, both of which are equivalent to nuclei, and probably are characterized chemically by the so-called Nuclein. By the conjugation of one of these male and one of these female nuclear structures arises the first nucleus of the new creature, which is therefore to be regarded as a hermaphroditic formation, and appears as carrier of male and female characters. From this first embryonic nucleus all nuclei of the perfected creature are derived in uninterrupted succession, and these therefore are likewise representatives of both the generating organisms. Through special operations of their minutest constituent particles, the nuclei condition first the phenomena of multiplication of the cells, and secondly their growth in volume and quality. Typical conformations of particular organs and complete organisms are the result of definite combinations of cell-divisions and processes of cell-growth, and therefore the nuclei, by means of their typical forces derived from the generative elements, dominate the whole constituent process of the organisms, or, in one word, the inheritance.

In agreement with his friend Nägeli's views as to the vegetable kingdom, Koelliker believed in a polyphyletic origin for the animal kingdom. He did not accept Ontogeny as any guide to a general Phylogeny, arguing that the stages of development in one group of creatures might recapitulate the genealogical history of that group, without in any way proving its relationship to other groups. He courteously but emphatically explains his attitude of opposition to Darwin, Haeckel, and Weismann. To the manifolding of organisms through the natural selection of favourable variations, he opposes his own idea that "the origin of the whole organized world is to be accounted for by a great plan of evolution continually driving on the simpler forms to more and more diversified developments." There is something unsatisfying in a doctrine which seems to say that the world has been evolved by a plan of evolution which evolves it. But naturally the acute professor has much to say to make his opinion wear an air of plausibility. For those who advocate a whole forest of genealogical trees in place of one grand many-branching stem, there is at least this to be said. Any complete and self-consistent theory of evolution must surely have its basis, not in spontaneous generation, but in some orderly transition from the inorganic to the organic. That the requisite conditions for this should have occurred only at one point of time and one point of space, and have produced only one or two organisms, is not on the whole very probable. Nature works with so much affluence that very rarely does any known thing prove in the end to be really rare. When the undiscoverable is discovered, one expects soon to hear that the new rarity is in fact freely disseminated through the universe. It is quite conceivable that in past ages countless specimens of the simplest organic type were produced and that they are still being produced, but none the less all chance of

favourably starting independent phylogenies may have come to an end at a very early period through the domineering capacity of some masterful race. On these questions the open mind is still as ever desirable. Indefatigable, minute investigation of facts, by men like Koelliker, can never be dispensed with.

[T. R. R. S.]

SIR ROBERT LLOYD PATTERSON, Knight Bachelor, Deputy Lieutenant, Justice of the Peace, and Fellow of the Society since 17th April, 1874, was the son of Robert Patterson, F.R.S., the zoologist, and was born at Belfast on 28th December, 1836. He went to school at the Royal Academical Institution, Belfast, and afterwards spent some time at Stuttgart. Returning to Belfast, he joined in business with Richardson Brothers, in the staple trade of flax, yarn, and linen; in 1858 he set up on his own account, and a prosperous career resulted till his retirement in 1886. His work in connection with the Chamber of Commerce was from 1864 onward; he was twice its President, in 1880 and 1895, and was Honorary Treasurer at the time of his death; he was knighted in August 1902.

His recreations were in natural history; his favourite cruising ground was Belfast Lough, and he was constantly scanning its fauna: in 1880 he published a volume on 'The Birds, Fishes, and Cetacea of Belfast Lough,' which ran into a second edition. He was a constant contributor to the 'Irish Naturalist,' 'The Field,' and Nature Notes published weekly in the 'Northern Whig.' He had a fine collection of Irish birds, and gave many specimens to the Patterson Museum, established at the People's Palace. An active supporter of the Belfast Natural History and Philosophical Society, he twice filled the chair, in 1881 and 1894. The 'Northern Whig' summarised his life thus in a leading article:—"The death of Sir Robert Lloyd Patterson, although not unexpected by his relatives and by those who knew his recent condition of health, will come with something of a shock to the public, long accustomed to his active and vigorous presence in their midst. Sir Robert represented a type now less often seen—the shrewd and active business man, who also finds leisure thoroughly to cultivate some branch of science or literature and to make a name for himself in connection with it." [B. D. J.]

WILLIAM PHILLIPS was born at Presteign in Radnorshire in May 1822, migrated to Shrewsbury at the age of ten, and there breathed his last, on 22nd October, 1905, in his 84th year. It was not till about 1861 that he took up the study of Botany, at first in a general sense, afterwards concentrating his attention on Fungi. He was a neighbour of the Rev. W. A. Leighton, author of the well-known 'Flora of Shrewsbury,' and 'The Lichen-flora of Great Britain,' 1871, etc. Mr. Phillips drew up a list of flowering plants and ferns of the neighbourhood, for

Pigeon's 'Handbook of Shrewsbury,' and he was connected with the Caradoc Field Club, as botanic referee from 1873 up to the time of his death, when he was Vice-President.

He prepared and issued four fasciculi of 'Elvellacei britannici,' from 1874 to 1881. His contributions published in our issues were:—"On a new species of *Helvella* (*H. californica*, Phillips)," Transactions, ser. II. Bot. i. (1880) p. 423, pl. 48; "A Revision of the Genus *Vibrissa*," *ib.* ii. (1881) pp. 1-10, pls. 1, 2; and "Some Observations on the 'Breaking' of the Shropshire Meres," which came out in our Proceedings, 1881-82, p. 29. This last was amplified in an account issued in the seventh volume of the 'Transactions' of the Shropshire Archaeological Society in 1884; and the subject was again taken up, read before the Caradoc Field Club, and published in 'The Midland Naturalist,' with two coloured plates, in 1893. His most extensive work, and only volume, was 'A Manual of British Discomycetes' in the International Science Series in 1887; other papers were contributed to the local societies named, and with Dr. Plowright he drew up two papers on "New and Rare British Fungi," which appeared in 'Grevillea' in 1873-74. Always fond of antiquarian research, latterly he gave nearly the whole of his leisure to that study, but preserved his interest in botany to the last. A short time before his death, his health failed somewhat; an attack of heart-trouble had apparently yielded to medical treatment, but in the same night he passed quietly away during sleep. He was buried amidst tokens of universal mourning on the part of friends and fellow-citizens.

Quiet and unassuming, he did an immense amount of work, not only in botany and archæology, but in more purely local requirements, as at the Museum, on the public documents, and similar work, at the same time shunning publicity. His connection with the Linnean Society began 3rd June, 1875, and he was also a Fellow of the Society of Antiquaries.

The genus of Fungi *Phillipsia* was established in our Journal in 1881, by the Rev. M. J. Berkeley, in honour of our deceased Fellow. [B. D. J.]

RICHARD RIMMER, who died at his residence, Dalawoodie, Dumfries, on 19th August, 1906, was a keen all-round naturalist, but he paid special attention to the Mollusca of Britain. He was elected Fellow of our Society on 1st May, 1879, and in the following year he brought out a small volume on his favourite subject, entitled 'The Land and Fresh-water Shells of the British Islands,' London, 1880, 8vo., of more than 200 pages and a dozen plates, some of which were produced by photography, one of the earliest applications of that art to malacologic illustration. In 1887 he removed from Westbourne Crescent, Hyde Park, to St. Albans, and after two years in that town he migrated to Dumfries, where he ended his days, at the age of 79. [B. D. J.]

Mrs. PERCY SLADEN, 1848-1906.—Constance Anderson, daughter of the late William Charles Anderson, M.R.C.S., J.P., sometime Sheriff of York, was born in that city on the 11th of August, 1848. The noble minster of her native place may be credited with having kindled in her an enthusiasm for architecture and antiquarian lore. One of her brothers, Dr. Tempest Anderson, M.D., D.Sc., F.L.S., has informed us that in the outset of life her taste was cultivated at the York School of Art and in Rome. Among the results of the proficiency thus attained are spirited accounts of some important English churches, which she published at the prompting and under the editorship of Professor Bonney, F.R.S., in 1884 and 1890. One of these essays describes the grand cathedral with which from childhood she had been familiar. The others are concerned with the less renowned but archæologically and otherwise very interesting parish churches of Louth, Halifax, and Bradford, and the Abbey church of Selby. In regard to the last of these, the authoress remarks that "to give any idea of the beauty of the interior, words utterly fail," and then proceeds, with perhaps designed inconsistency, by her own skilfully worded sketch to evoke a very pleasing conception of its numerous charms. Upon wedding Mr. Percy Sladen in 1890 she readily allowed her lively intelligence to be directed to a new sphere of interest. For five years after his marriage Sladen continued to be, as he had been for five years before it, Zoological Secretary of this Society. The President in his address has explained how the sympathy between genial husband and genial wife led eventually to the foundation of the Percy-Sladen Trust, a boon to science great in promise and already not insignificant in performance. Before this came about there had to be intervening days of sunshine and days of sorrow. In 1898 the husband inherited a large fortune. In 1900 the wife became a widow. Thus it fell to her lot to carry out his wishes, and to show in only too brief opportunity that she knew how to make no ignoble use of riches. In the tribute of this memorial notice she herself enjoys a sorrowful primacy, won by what in the language of human ignorance we call her untimely death on the 17th of January, 1906. In the ranks of women who have been expressly honoured by the Linnean Society, the past yields two conspicuous examples—Lady Smith, who survived her husband, our Founder, for nearly fifty-six years, and Queen Victoria, who was for a still longer period our gracious patron. But neither of these remarkable persons was eligible for the ordinary Fellowship, to which Mrs. Percy Sladen was admitted, with a bevy of other ladies, on the memorable 19th of January, 1905, when the tardy recognition of women's aptitude for biological research received its inaugural blessing so far as this great house of science was able to bestow it. [T. R. R. S.]

WILLIAM SOWERBY, who died on 9th March, 1906, at his residence at Baker's End, Ware, Herts, aged 79, came of a family well known in the records of natural history in this country. His

grandfather, James Sowerby, A.L.S. (1757–1822), is known for his drawings in 'English Botany' and 'Coloured Drawings of English Fungi,' and his three sons, James De Carle Sowerby, F.L.S., George Brettingham Sowerby, F.L.S., and Charles Edward Sowerby, A.L.S., continued the family tradition as botanic artists or conchologists.

The subject of our notice, the son of James De Carle Sowerby, was born in 1827. About the year 1844 he became assistant to his father, the first Secretary to the Royal Botanic Society, Regent's Park, whom he ultimately succeeded about 1869. In 1880 he noticed the presence of a freshwater Medusa in the tank in which the great water-lily *Victoria regia* was cultivated in the Gardens under his charge, and the singular occurrence in fresh-water was investigated independently by the late Prof. Allman, at that time our President, and Prof. E. Ray Lankester. The President described the animal as *Limnocoedium Victoria* in our 'Journal,' Zoology (xv. pp. 131–137), while Prof. Lankester suggested that *L. Sowerbii* would appropriately commemorate the discoverer. In 1895 Mr. Sowerby resigned his post, and was succeeded by his son, Mr. J. B. Sowerby, the present Secretary. He was elected Fellow, 7th March, 1872. [B. D. J.]

FREDERICK TOWNSEND, who died at Cimiez, Alpes-Maritimes, on 16th December, 1905, at the age of 83, was elected comparatively recently into the Linnean Society, on 18th April, 1878. He was born at Rawmarsh Rectory, Yorkshire, on 5th December, 1822, was educated at Harrow, and Trinity College, Cambridge, graduating B.A. in 1850, and proceeding M.A. in 1855. It was whilst he was in residence at Cambridge that he became acquainted with C. C. Babington and W. W. Newbould, whose critical views on British botany were congenial with his own. With them he botanised round Cambridge, and his first paper, on *Glyceria pedicellata*, was published in the 'Annals and Magazine of Natural History' in 1850; from this time onward he was constantly publishing notes of his observations, as may be seen overleaf, and in 'The Journal of Botany' for April 1906, which also contains an admirable photogravure of our late Fellow. In our 'Journal,' Botany, xviii. (1881) pp. 398–405, pl. 15, he gave an account of his discovery of *Erythræa capitata*. His most considerable undertaking was his 'Flora of Hampshire,' 1883, the result of many years' work, and he lived to revise it and issue a second edition in 1904.

Soon after his marriage in 1863, Townsend settled at Shedfield Lodge, Wickham, South Hants, and there he began his work on the county flora, which practically ended only with his life. In 1874 he succeeded to the family seat of Honington Hall, Shipston-on-Stour, Warwickshire, on the border of Gloucestershire. Here he lived as an ideal country squire, and represented the Stratford-on-Avon division in the House of Commons, from 1886 to 1892, when he retired.

The genus *Euphrasia* was his special study during the last few years of his life, and he described one form as *E. canadensis* which he gathered at Quebec, and figured in the 'Journal of Botany' for January 1898.

He was a Member of the Botanical Society of Edinburgh so far back as 1846, and also of the Société botanique de France from 1872, to whose 'Bulletin' in 1878 he contributed a note on a *Veronica*. He was an accomplished draughtsman, and excelled in certain field sports, but was extremely modest and free from the slightest suspicion of ostentation. From his residence being far removed from London, he was not a frequent attendant at our Meetings, but almost every few months he was accustomed to work in our Library, and paid constant visits to the Department of Botany, British Museum.

BIBLIOGRAPHY.

- On a supposed new species of *Glyceria* [*G. pedicellata*]. Ann. Mag. Nat. Hist. ser. II. v. (1850) pp. 104-108; Trans. Edinb. Bot. Soc. iv. (1853) pp. 27-30.
- [On a monstrosity of *Daucus Carota* from Guernsey.] Bot. Gazette, London, iii. (1851) p. 50.
- Contributions to a Flora of the Scilly Isles. Journ. Bot. ii. (1864) pp. 102-120.
- On some points relating to the Morphology of *Carex* and other Monocotyledons. *Ib.* xi. (1873) pp. 162-166.
- On *Anthoxanthum Puelii*, Lec. et Lam.; with some remarks on other species of the genus. *Ib.* xiii. (1875) pp. 1-5, pl. 157.
- On some species of *Cerastium*. *Ib.* xv. (1877) pp. 33-37.
- Sur une nouvelle espèce de *Veronica* [*V. lilacina*]. Bull. Soc. Bot. Fr. xxv. (1878) pp. 15-21, pl. 1.
- Ulex nanus* in South Hants. Journ. Bot. xvii. (1879) p. 84.
- Vulpia ambigua*, Le Gall, and *V. ciliata*, Link. *Ib.* pp. 195-196.
- Notes on the Flora of Hampshire. London [1879] 8vo. pp. 15.
- Euphorbia Paralias*, L. [a native of the Isle of Wight]. Journ. Bot. xvii. (1879) pp. 314-315.
- Erythrææ* in the Isle of Wight. *Ib.* pp. 327-329.
- Hampshire Botany. *Ib.* xviii. (1880) pp. 50-51.
- On an *Erythræa* new to England [*E. capitata*, var. *sphærocephala*] from the Isle of Wight and South Coast. Journ. Linn. Soc., Bot. xviii. (1881) pp. 398-405, pl. 15.
- On *Erythræa capitata*, Willd. Journ. Bot. xix. (1881) pp. 87-88.
- Note on *Carex flava*, L. *Ib.* pp. 161-163.
- Notes on report of Botanical Exchange Club for 1879. *Ib.* p. 175.
- Festuca oraria*, Dumortier. *Ib.* p. 242.
- On *Erythræa capitata*, Willd., var. *sphærocephala*. *Ib.* pp. 302-303.
- Flora of Hampshire, including the Isle of Wight; or, a List of the Flowering Plants and Ferns found in the County of Southampton, with localities of the less common species. London (Lovell Reeve & Co.) 1883. 8vo, pp. xxiv, 524, 2 pls., map (1 page additional corrections).
- Second Edition. *Ib.* 1904, pp. xl, 658, 2 pls. & map.
- Homologies of the Floral Envelopes in Gramineæ and Cyperaceæ. Journ. Bot. xxiii. (1885) pp. 65-74, 17 figs.

Ranunculus Steveni, Andrzej., and *R. acris*, L. Journ. Bot. xxvii. (1889) pp. 140-141.

Monograph of the British species of *Euphrasia*. Prefaced by an epitome of Prof. Wettstein's views on the development and distribution of the European species. *Ib.* xxxv. (1897) pp. 321-336, 395-406, 417-426, 465-477, pls. 374-380, figs.

Ranunculus acer, L. *Ib.* xxxviii. (1900) pp. 379-383.

Lepidium heterophyllum, Bentham. *Ib.* pp. 420-421.

Botany [of Hampshire including the Isle of Wight]. In Victoria History of Hampshire and the Isle of Wight. Westminster, 1900. Fol. Vol. i. pp. 47-69.

[The special groups, *Rubi*, Roses, and Cryptogams, forming pages 69-87, were contributed by specialists.]

A new form of *Euphrasia curta*, Fr., by Prof. James W. H. Trail. Ann. Scot. Nat. Hist. (1902) pp. 177-178.

[Contains the technical description by Townsend of *E. curta* forma *piccola*; reprinted in Journ. Bot. xl. (1902) pp. 362-363.]

Euphrasia scotica. Journ. Bot. xli. (1903) pp. 57-58.

Lepidium Smithii, Hook., var. *alatostyla*. *Ib.* pp. 97-98.

Arabis ciliata, R. Br. [collected in South Kerry]. *Ib.* pp. 278-279.

Galium sylvestre in Worcestershire. *Ib.* xlii. (1904) p. 240.

North Devon Plants. *Ib.* pp. 353-354.

[B. D. J.]

WELDON, Prof. W. F. R.; see page 109.

June 7th, 1906.

Prof. W. A. HERDMAN, F.R.S., President, in the Chair.

The Minutes of the Anniversary Meeting of the 24th May were read and confirmed.

Rev. James Lamont was admitted a Fellow.

Mr. Morley Thomas Dawe, Dr. Arthur Thomas Masterman, and Mr. James Anthony Weale were proposed as Fellows.

Dr. Robert Brown (of Glasgow), Mr. Henry Robert Knipe, Mr. Henry John Waddington, and Miss Evelyn Janie Welsford were severally elected Fellows.

The President announced that he had nominated the following as Vice-Presidents for the ensuing year:—Rev. Canon Fowler, Mr. Horace W. Monckton, Lt.-Col. Prain, and Dr. A. Smith Woodward.

The General Secretary exhibited a small oil-painting on panel of Linnaeus, after Pachel (sight measure $9\frac{1}{4} \times 7\frac{3}{4}$ in.), the property of Mr. Blackwell, which he had acquired as a portrait of Jean Jacques Rousseau (the *Linnaea* having been taken for periwinkle). He had detected the error by the close correspondence of a print engraved by C. E. Wagstaff, and published by Charles Knight for the Society for the Diffusion of Useful Knowledge. This print

purported to be engraved from a portrait in the possession of Robert Brown, but it displayed a curtailment of the figure and accessories from the picture by L. Pasch which Robert Brown gave to this Society in 1853 on his quitting the Chair, the history of which is well known (Proceedings, 1888-90, pp. 24-25). The question was raised, could this cabinet picture have been also in the possession of Robert Brown?

In the discussion which followed, Mr. Carruthers stated that Robert Brown left all his property to his successor, J. J. Bennett, his own predecessor at the British Museum, and he was certain that if the portrait now shown had belonged to Brown, Bennett would have carefully kept it, and ensured its conservation. Mr. Hopkinson, Dr. G. H. Fowler, Rev. T. R. R. Stebbing, Sec.L.S., Rev. Canon Smith, who pointed out that by a still legible label the frame must have been made not later than 1837, and Mr. Henry Groves also spoke.

The President exhibited tubes showing stages in the metamorphosis of a young flat-fish (*Pleuronectes platessa*), the plaice, leading from the symmetrical larva to the asymmetrical young flat-fish. These fish were hatched and reared in the Port Erin Biological Station. He further mentioned the operations conducted this year in hatching and liberating some millions of young plaice.

The following papers were read and discussed:—

1. "On two new Species of *Populus* from Darjeeling." By H. H. Haines, F.L.S.
2. "Biscayan Plankton.—Part VIII. The Cephalopoda." By W. E. Hoyle. (Communicated by Dr. G. H. Fowler, F.L.S.)
3. "Biscayan Plankton.—Part IX. The Medusæ." By E. T. Browne. (Communicated by Dr. G. H. Fowler, F.L.S.)
4. "On the Conifers of China." By Dr. M. T. Masters, F.R.S., F.L.S.

June 21st, 1906.

Dr. A. SMITH WOODWARD, F.R.S., Vice-President, in the Chair.

The Minutes of the General Meeting of the 7th June were read and confirmed.

Miss Lilian Suzette Gibbs, Miss Evelyn Janie Welsford, Mr. William Devison Roebuck, and Mr. Henry John Waddington were admitted Fellows.

Mr. Henry Edward Houghton and Mr. Thomas Fox were severally elected Fellows.

MR. W. SAVILLE KENT, F.L.S., exhibited transparencies and lantern-slides in a three-colour process of photographs of Fish and associated Fauna of the Polynesian Coral-reefs.

The Vice-President in the Chair, Rev. T. R. R. Stebbing, and Mr. W. Carruthers contributed to the discussion which followed, and were replied to by the exhibitor.

Prof. F. E. WEISS, F.L.S., showed a section and an enlarged drawing of a section of the root-tip of *Lyginodendron oldhamium*, a fossil Cycadofilix from the Lower Coal-Measures, displaying an extraordinary preservation of the young tissues.

The Chairman having invited discussion, Dr. D. H. Scott and Mr. Carruthers spoke on the highly interesting character of the section shown.

Mr. H. J. WADDINGTON, F.L.S., placed on the table some cases of prepared Crustacea, in series from the youngest to the fully adult state. The Rev. T. R. R. Stebbing and Prof. C. Stewart referred to the remarkable excellence of the preparations; and Mr. Waddington, in acknowledging the vote of thanks, stated that most of the credit was due to his wife, who was his most effectual helper.

The following papers were read and discussed:—

1. "Botany of Southern Rhodesia." By Lilian Susette Gibbs, F.L.S.
 2. "The Original Portraits of Linnæus." By William Carruthers, F.R.S., F.L.S.
 3. "Plantæ novæ Daweanæ in Uganda lectæ." By Dr. Otto Stapf, F.L.S.
 4. "The Genitalia of Diptera." By W. Wesché, F.R.M.S. (Communicated by John Hopkinson, F.L.S.)
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ABSTRACTS.

I.

Note on the Distribution of the Genus *Shortia*, Torr. & Gray.

By B. DAYDON JACKSON, Gen. Sec. L.S.

[Read 15th February, 1906.]

At the General Meeting held on the 7th December, 1905, Mr. W. T. Hindmarsh, F.L.S., sent photographs of a plant of *Shortia uniflora* in cultivation in his garden at Alnwick. In the discussion which followed, enquiry was raised as to the number of species contained in the genus, and the present short paper is an attempt to answer the question then put.

The original species, *S. galacifolia*, was collected in Carolina by Michaux, in fruit, and described by Asa Gray from the single specimen at Paris, in 1839; the plant was not again found till nearly a century after the first discovery, and then in McDowell County, in South-west Virginia. The original station has since been found again by referring to Michaux's manuscript journal, as recounted in the 'Botanical Magazine,' t. 7082.

The second species, *S. uniflora*, was at first placed under the closely allied genus *Schizocodon*, it was found in the province of Shinano, Nippon; and a third, *S. sinensis*, is recorded from Mengtze, Yunnan.

Investigation of the material contained in the national herbaria of Kew and the British Museum, seems to point out that there are three good species of *Shortia* (noted above); one doubtful one, *S. rotundifolia*, described by Maximowicz as *Schizocodon*, but the corolla not seen by him; and *Shortia thibetica*, more appropriately placed as a monotypic genus.

The distinctions between the allied genera, *Shortia*, *Schizocodon*, and *Berneuxia* are not very strongly marked in every case, but the following lists may be of some use.

BERNEUXIA, Decne. in Bull. Soc. Bot. Fr. xx. (1873) 159.

thibetica, Decne. l. c.—Mupin.

Syn. *Shortia thibetica*, Franch.

SCHIZOCODON, Sieb. & Zucc. in Abh. Akad. Muench. iii. (1843) 723, t. 2.

ilicifolius, Maxim. in Bull. Acad. Pétersb. xii. (1868) 71.—Japon.

rotundifolius, Maxim. l. c. xxxii. (1888) 497.—Ins. Meiacosima.

soldanelloides, Sieb. & Zucc. l. c.—Japon.

uniflorus, Maxim. in Bull. Acad. Pétersb. xii. (1868) 71=
Shortia uniflora, Maxim.

SPORTIA, Torr. & Gray, in Am. Journ. Sc. ser. I. xlii. (1842) 48 ;
et ser. II. xlv. (1868) 402.

Davidi, Franch. in Nouv. Arch. Mus. Par. sér. II. x. (1887)
t. 13 B = *Berneuxia thibetica*, *Decne.*

galacifolia, Torr. & Gray, l. c. — Am. bor.

rotundifolia, Makino, in Tokyo, Bot. Mag. ix. (1895) 327 ;
et x. (1896) 221 = *Schizocodon rotundifolius*, *Maxim.*

sinensis, *Hemsl.* in *Hook. Ic. Pl.* t. 2624. — Yunnan.

thibetica, Franch. in Nouv. Arch. Mus. Par. sér. II. x. (1887)
54, t. 13 B (*Davidi*) = *Berneuxia thibetica*, *Decne.*

uniflora, *Maxim.* in *Bull. Acad. Pétersb.* xvi. (1871) 225.
— Japon.

II.

The Origin of Gymnosperms.

By Prof. F. W. OLIVER, F.R.S., F.L.S.

[Read 15th March, 1906.]

THE investigations of Hofmeister have been regarded as settling once for all the general relation of affinity between the Gymnosperms and Vascular Cryptogams. Critical analysis of this work and later contributions in the same field have led to the recognition of several distinct lines of descent within the latter class, and at one time and another each of these lines has been favoured as that from which the Gymnosperms arose. In recent times, the balance of opinion has set in the direction of the Ferns, the point of closest contact being found in the Cycads. The view has gained material support through the discovery of multiciliate spermatozoids in the last-named group and in *Ginkgo*, as well as from the recognition of the existence in Palæozoic times of an extensive plexus of forms (the Cycadofilices) which, whilst retaining the habit and many of the structural peculiarities of Ferns, show a distinct advance in the direction of the Cycads. Now that evidence has come to light proving that many of the forms there included were seed-bearing plants, the foundation of a new Class, the Pteridospermeæ, has been judged expedient for these Spermatophytes which have so much in common with the Ferns.

As matters are shaping at the present time, it would appear that certainly a preponderating number of so-called Palæozoic "Ferns" are in reality Pteridosperms which have been hitherto confounded with true Ferns in view of their frond-like habit and lack of distinguishing organs of reproduction. The existence of a great reserve of supposed Ferns in the older rocks has served as a material bulwark to the Hofmeisterian doctrine of the passage of Pteridophytes into Spermatophytes. But if the Palæozoic is in reality the "age of Pteridosperms" rather than the "age of

Vascular Cryptogams," the position becomes altered, and the question is one that should engage the attention of Botanists. When it is borne in mind that, so far as the geological record goes, seed-bearing plants (Cordaiteæ) are of at least equal age with true Ferns, the perplexities of the situation become manifest.

Another question upon which an expression of opinion would be valuable, is whether the whole group of Gymnosperms may be regarded as having been evolved along the Fern-Cycad line, or whether, on the other hand, some of them at least may have had a quite distinct origin.

Palæobotanical work has shown that in the Lycopod phylum seed-like structures were occasionally produced, and this discovery no doubt seems to strengthen what has always been a possibility, viz., that a portion of the Gymnosperms may have had its origin along this line.

III.

On the Earlier Geological Record of the True Ferns.

By E. A. NEWELL ARBER, M.A., F.L.S., F.G.S.

[Read 15th March, 1906.]

It is evident that the Palæozoic Pteridosperms exhibit, both in their habit and anatomy, marked characters in common with the true Ferns, and it is therefore regarded as more than probable that they sprang from a Fern-like stock. Thus the Fern line of descent must be geologically older than the Pteridosperms. Yet the recent discoveries as to the nature of the male and female fructifications of these Fern-like, seed-bearing plants have tended in part to obliterate, and in part to cast strong suspicion upon, much that was formerly regarded as undeniable evidence of the existence of the true Ferns in the Palæozoic Period.

There is, however, every reason to believe that true Ferns did exist in Carboniferous and Permian times. The Botryopterideæ, and certain unassigned fronds bearing annulate sporangia were among the chief representatives. But it is doubtful whether the Palæozoic Ferns were clearly and generally differentiated into Eusporangiata and Leptosporangiata. In the fossil state we have naturally no evidence as to the development of the sporangia, and further, the biseriate or multiseriate annulus of Palæozoic sporangia does not agree with that of modern Leptosporangiata spore-bearing organs. It would thus seem better to regard the Palæozoic Ferns as a separate class, from which both the Leptosporangiata and Eusporangiata were eventually derived. The name *Primofilices* is suggested to denote this race; since the preferable terms, *Archæopterideæ* and *Palæopterideæ*, are not available. The

Botryopterideæ constitute one family of the Primofilices, and others will probably be distinguished in the near future.'

The origin of the Leptosporangiatae from the Primofilices is clear. This group began to differentiate at the close of the Palæozoic period. Possibly some of the Sphenopterid fronds of the Carboniferous and Permian rocks, bearing annulate sporangia, were the earliest offshoots in this direction. In the true Mesozoic floras (Rhætic, Jurassic, and Wealden) the various families became marked out, and there is abundant evidence that the Leptosporangiatae then formed one of the dominant or ruling types of Mesozoic vegetation.

On the other hand, the question may well be asked, Is there any trustworthy evidence of the existence of the Eusporangiatae in either the Palæozoic or truly Mesozoic floras? In neither is there any evidence at all of the Ophioglossaceæ, and the only instance of possible Mesozoic Marattiaceous fronds with which I am acquainted are three in number, and all of Rhætic age. In two species of *Teniopteris* (including the typical Rhætic species *T. Münsteri*) sporangia, resembling those of the modern *Marattia*, have been found on certain fronds while in *Danceopsis*, another related genus, the synangia more closely resemble those of *Dancea*. The suspicion is not wanting, however, that the fronds of *Teniopteris* may have been those of a Cycad rather than a Fern.

In the Palæozoic rocks, we find a plexus of fronds of the Sphenopterid and Pecopterid type, bearing exannulate sporangia, arranged independently in the sorus, or united to form synangia. These have been generally regarded as of Marattiaceous affinity. The great difficulty, at the present moment, is to decide as to the true nature of these fronds. Did they belong to true homosporous Ferns, or were they the male fronds of Pteridosperms? On the present evidence, I am inclined to think that a large number, though not necessarily all, will eventually prove to fall under the latter category. We already know that one *Pecopteris* (*P. Pluckenetii*), though not a very typical member of the genus, belonged to a Pteridosperm. Also the male frond of the Bennettiteæ, a group descended from the Pteridosperms, is known to have borne sporangia not unlike those of the Palæozoic Pecopterids and the modern Marattiaceæ.

The anatomy of the tree-fern, *Psaronius*, affords the most trustworthy evidence, at present, of the existence of the *Eusporangiatae* in Palæozoic times; though there would appear to be little to indicate that this group ever attained to the position of a dominant or ruling type in either the Palæozoic or truly Mesozoic floras.

IV.

The Evolution of Gymnosperms: The Position and Ancestry of the Araucariæ. By A. C. SEWARD, F.R.S., F.L.S.

[Read 15th March, 1906.]

THE genera *Araucaria* and *Agathis* may be regarded as surviving members of an ancient group of Gymnosperms distinguished by several well-marked characters from other Coniferales. During the Mesozoic era the Araucariæ were widely distributed and played a prominent part in the Northern floras; they are now confined to comparatively restricted areas in the Southern hemisphere. Our object is to enquire into the evidence on which the statement as to the antiquity of the Araucariæ is based, and to ascertain whether the records of the rocks lend support to a view expressed by some botanists that they represent the oldest section of the Coniferales. A further question suggested by the examination of palæontological data, is the possession by *Agathis* and *Araucaria* of characters which may be designated primitive.

In view of the widely accepted conclusion that Cycads and Ferns were descended from common ancestors, it is important to consider whether the contention that Conifers as well as Cycads are derived from a Filicinean stock is supported by satisfactory evidence. While accepting Cycads as descendants of Filicinean ancestors, the Author is led to the conclusion that Conifers, or at least the Araucariæ, should be referred to a Lycopodiaceous origin.

The following headings may serve to suggest some of the questions to be dealt with in discussing the origin of the Araucariæ:—

- i. The widespead occurrence of Mesozoic fossils referred to the Araucariæ.
 - ii. Features in which *Agathis* and *Araucaria* differ from other members of the Coniferales: the isolated character of the Araucariæ and the primitive nature of some of their peculiarities.
 - iii. Examination of the evidence adduced in favour of including Conifers with Cycads as descendants of Filicinean ancestors.
 - iv. Comparison of the vegetative and reproductive shoots of the Araucariæ with those of recent and fossil Lycopods from the point of view of a close relationship between the two phyla.
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V.

On the Structure of the Stem and Leaf of *Nuytsia floribunda*,
R. Br. By E. J. SCHWARTZ, F.L.S.

[Read 5th April, 1906.]

NUYTSIA FLORIBUNDA is a member of the Loranthaceæ and a native of West Australia; unlike other members of this order, it is non-parasitic and a tree attaining a height of some 30 feet. The leaves are linear-acute, of length about 1 inch, and the stomata, which are in more or less regular rows, are transverse to the leaf-axis. In section, the leaves show a meristele of three bundles embedded in a water-storing tissue which is in turn surrounded by the assimilatory tissue; one or more resin-sacs are to be found above the bundles. The stem has many points of interest—a heterogeneous strongly thickened and pitted pith containing a central resin-canal proper to the stem itself, accompanied by three or more perimedullary canals; islands of phloem and cambium embedded in secondary xylem; and a cork of epidermal origin,—all points of difference from the other members of the Loranthaceæ. The assimilatory tissue throughout the plant is rich in tannin, and no calcium-oxalate crystals are to be found in the stem.

The paper was illustrated by slides from photographs of the author's preparation.

VI.

The Affinities of Pteridosperms and Gymnosperms.
By Dr. D. H. SCOTT, F.R.S., Sec.L.S.

[Read 3rd May, 1906.]

As an advocate, for the last ten years, of the Filicinean origin of Cycads, and probably of Gymnosperms generally, I should like to remove a misapprehension which appears to exist in some quarters. It was suggested in 1895 that the Cycadofilices *Lyginodendron* and *Heterangium* were the “derivatives of an ancient and generalized (or rather non-specialized) Fern-stock,” and in 1899 the opinion was expressed that this “common stock was to be sought among simple Ferns or Fern-like plants.” At no time has it been held that the Cycadofilices or Pteridosperms, to use the current name, sprang from any family of Ferns already known, still less from any family represented in the recent Flora.

So far as the morphological evidence is concerned, the position is unaltered at the present time. The important discoveries of the seeds of the Pteridosperms scarcely touch this question, for

these organs are of too advanced a type to throw light on the probable derivation of the group.

The anatomical characters clearly indicate an affinity with the Fern-stock closer than that with any other Cryptogamic phylum. The male organs, now beginning to be known, further support this affinity. Hence we are led to conclude that the Pteridosperms had a common origin with the Ferns, and may assume that the common ancestors resembled Ferns in being Cryptogamic rather than Spermatophytic.

The difficulty arises from the surprising extension of the Pteridosperms, which threaten to absorb everything Palæozoic that used to be called a Fern. But this idea is of the nature of a "scare." Though the Ferns were not the dominant group in the Palæozoic that they were once supposed to be, there is as yet no justification for the extreme view that they were non-existent. The important position of the Botryopteridæ as a synthetic family, perhaps most nearly representing among known Palæozoic plants the common stock from which Ferns and Pteridosperms may have sprung, has already been indicated by a previous speaker. I agree with him that the family is best regarded as a special type of a much more extensive group.

As regards the other great question under discussion—the affinities of the Coniferæ—the data are still very inadequate, for we have little knowledge of the structure of early forms of Coniferæ. In some Permian plants referred to Araucariæ, the structure of the wood was of the *Araucarioxylon* type, a widespread form of wood, common to Cordaitæ, Pteridospermeæ, and even Botryopteridæ, but almost wholly absent from the Lycopod phylum. Whatever this character may be worth, it favours a common origin of the Araucarian Conifers with the Cordaitan and Pteridospermic series.

The existence of the Cordaitæ, offering clear points of agreement at once with Pteridosperms, Cycads, Ginkgoales, and Conifers, certainly suggests that all these groups ultimately had a common origin from the same great plexus of primitive Filicineæ. *Ginkgo* itself forms a bond of union between the Cordaitan phylum and the Taxaceæ among Conifers.

The Lycopods attained a high development on their own lines, producing seed-like organs in certain cases, and showing some anatomical analogies with Conifers. A more exact comparison appears to indicate that these characters are homoplastic, and not indicative of any affinity with the higher plants.

VII.

On the Original Portraits of Linnæus.
By WILLIAM CARRUTHERS, F.R.S., F.L.S.

(With Plates 1-8.)

[Read 21st June, 1906.]

At the Annual Meeting in May 1889, I presented to the Society the results of some investigations into the portraits of Linnæus. I had not then seen any of the original paintings. But having made a considerable collection of the published portraits, which is now in the possession of the Society, I classified them, reducing them to nine different types. This opinion has been practically confirmed by subsequent inquiries. I resolved to inspect the authoritative originals from which these nine types of engravings had their origin. In 1891 I visited the various localities where these portraits are preserved. This led me slightly to modify and also to add to the statements published in the Proceedings of the Society for the Session 1888-89. After too long an interval I venture to place before the Society the results of my further investigations, quickened by the fact that the 23rd of May 1907 is the bicentenary of the birth of Linnæus, and that special interest will then be shown in every thing that relates to that great naturalist. I procured original photographs of all the authentic portraits, and I trust that these with the notes I submit may be of some interest to the Fellows of this Society.

I have been much assisted in this work by my friend Mr. Antony Gepp, F.L.S., and still more by his brother, the late Mr. Hubert M. Gepp, Adjunct Professor in Upsala University, who became much interested in my investigations, secured for me many engravings of Linné, and supplied me with information and with personal help when I visited Sweden.

I. 1737. HOFFMAN.

The earliest portrait of Linné was painted by Martinus Hoffman at Hartekamp, near Haarlem, for Dr. George Clifford, a rich merchant and burgomaster, who was of English descent, his ancestors having been for some time in Holland. Dr. Clifford had a great love for plants, and had collected many rare and interesting specimens in his fine garden. On the recommendation of Boerhaave, Dr. Clifford engaged Linné to name and classify all his plants. Linné had gone to Harderwyk to take his doctorate in the university there, which he did on the 24th June, 1735. His funds were exhausted, but the naturalists in Holland were kind and hospitable: in 1736 he took up his abode at Hartekamp, where he found in the owner of the house a cordial and liberal

friend. He published the 'Hortus Cliffortianus' in 1737, and in the same year the 'Flora Lapponica.' The frontispiece to this work, dedicated to Clifford, represents a Lapland landscape with Linné in the foreground, having on his knees the "drum," which appears in the full-length picture. This frontispiece was drawn by Hoffman, who in the same year painted the portrait of Linné for Clifford. This fine painting has remained in his family until this time, though no longer at Hartekamp. In 1891 Mr. Clifford was living at Nieuwetsluys, and when I visited him there he was most helpful. The painting has been very carefully conserved and is in extremely good condition. He gave me leave to have a photograph taken from it. He traced his family back to the days of William the Conqueror, and showed me an interesting record of the family history, turning to the pages which contained contemporary notes about Linné while he was at Hartekamp.

The original portrait has never been reproduced. Linné is standing with his face turned somewhat to the left, in his Lapland dress, with his gloves and various implements hanging from an ornamented leathern girdle. His right hand holds a plant of *Linnæa* in flower but without a label, and his left hand supports a large oval object which has puzzled many, but in the frontispiece to the 'Flora Lapponica' this is shown in two separate portions which have spread out on them small objects: it is apparently a press for drying plants. Around the sides of this press are written the words:—"Carolus Linnaeus e Lapponia Redux. Ætat. 30. Anno 1737. Mart. Hoffman fecit 1737." There is nothing on the canvas besides the portrait of Linnæus.

A replica or a copy of this portrait, painted in 1739, came into the possession of Dr. Robert Thornton towards the end of the eighteenth century. This is known only from the mezzotint engraving by H. Kingsbury, which was "published April 6, 1795, by H. Kingsbury, No. 4 Warren Street, Fitzroy Square." In 1804 Dr. Thornton had an exhibition of his botanical paintings at 49 New Bond Street, and the printed catalogue states that this painting is "A whole length of Linnæus aged only thirty-two, in his Lapland Dress. By Hoffman. An Original Picture. This was painted for Gronovius in Holland and is the only original Picture of Linnæus in England." Linné was indebted for much friendly help to Gronovius; at his suggestion Boerhaave introduced Linné to Clifford, and at the expense of Gronovius the first edition of the 'Systema Naturæ' was published at Leyden in 1735. It is very likely that he would desire to possess the portrait of a friend he valued so highly.

In 1811 Thornton got permission from Parliament to dispose of his paintings by a lottery, but this was unsuccessful. Thornton lived for twenty-six years after this, having died at his residence in Howland Street, Fitzroy Square, on June 22nd, 1837. I have failed to discover what has become of this or any of the other botanical paintings that belonged to Thornton. The only help

known by which one can form an idea of this painting is Kingsbury's mezzotint. There are in it several obvious modifications of the Clifford portrait. The standing collar is larger, the right hand holding the plant is more raised above the girdle, and there is attached to it a paper label with "*Linnea Gronov.*" written on it; a small horn is suspended from the belt between the clip which carries the gloves and the tassel, the ornaments on the drying-press are much modified, and the feet are wider apart. These modifications suggest that they were introduced by the original artist in painting a replica, though they may have been introduced by Kingsbury in his engraving. The most obvious difference between the mezzotint and the Clifford portrait is the column on which are placed eight volumes of Linné's works, each of them labelled, and all published in 1737 or the two previous years. If the engraver in 1795 had been working from a replica of the original painting, he may have thought it necessary to introduce the column in order to convert the comparatively narrow painting into his nearly square engraving. But, on the other hand, the works selected would have been much more likely to consist of the more important ones published after 1737. On the whole, it appears to me more probable that Thornton's painting was a replica in which the original artist introduced several modifications, and that it was painted for Gronovius. If it still exists it ought to be found in England, and is deserving of a careful search; the name being painted on the side of the drying-press would enable it to be easily identified.

There is a modern, three-quarters portrait based on the Clifford portrait in the possession of the Zoological Society of Amsterdam.

II. 1739. SCHEFFEL.

There are two portraits in Linné's house at Hammarby by Scheffel, a well-known Swedish portrait-painter. The one is inscribed on the back of the canvas—"Carl Linnæus; Med. Doctor, Dioscorides 2^{dus} dictus. Natus 1707 d. 13 Maij. I. H. Scheffel, p: 1739." The other is dated 1755, and though no name of a painter is given, there is good reason for saying that it was the work of Scheffel in the year stated. This will be more fully examined when I describe that portrait. The earlier one is of Linné as a bridegroom, when he was 32 years of age. It is now in a bad condition. It represents Linné about the age specified. The painting, however, so exactly agrees in its general treatment with Scheffel's other portrait taken sixteen years later, that I cannot get rid of the conviction that Scheffel, having produced a good likeness in 1755, painted his second portrait as a bridegroom, giving his own idea of what Linné would be like at that time. Linné returned in July 1738 from Holland by way of France to Sweden, and soon thereafter he was betrothed to Sarah Elizabeth Moræus, to whom he was married in June 1739.

The engraving by Ruckman after Scheffel is from this painting: I formerly, being misled by the softness of the engraving, thought it represented a third and younger painting by Scheffel.

III. 1740. EHRENSVERD.

The next portrait of Linné, taken when he was 33 years of age, was the work of Augustus Ehrensverd. The original engraved plate was, in 1891, in the possession of Baron Lewenhaupt, Upsala. It has not been published, but impressions have been taken from the plate at different times and circulated privately. Eichhorn had in his collection a print taken before the plate was lettered, and our Society possesses in a volume that was in the Library of Linné a print inserted while it was in his possession. The comparatively recent print in our collection of the Linnean portraits was presented by Dr. G. Lindström.

The engraving is lettered "Carolvs Linnæus Med: Doct: Natus 1707 Maj $\frac{13}{24}$ Ætat: 33," and immediately below the portrait "Au. Ehrensverd amica manu sc. 1740." The engraving has been made from life or from a drawing, so that in the print the whole is reversed. The wart which was on Linné's right cheek appears on the left cheek. The face is turned to the left, the right hand rests on a volume labelled on the back "Syst. Nat.," while the left hand, resting on the right, holds a flowering plant of *Linnæa borealis*. On his left shoulder is an academic gown which comes round below the right arm to the front of the body in great folds.

Ehrensverd's engraving is the original of most of the 8vo plates which illustrate the works of Linné.

There is in the possession of Prof. Tullberg, Upsala, a small painting on vellum, 5 inches by $3\frac{1}{2}$, which is certainly copied from Ehrensverd. The general pose of the figure, and the similar accidental peculiarities like the creases in the sleeve of the coat and in the gown, are conclusive evidence of this. The direction of the figure is the same as in the metal plate engraved by Ehrensverd, and consequently differs from that on the prints from his plate. The left hand rests on the volume, and the right hand holds the *Linnæa*. Besides an obvious feebleness and softness in the portrait, this picture and its reproductions can easily be distinguished from its original by the narrow black tie which passes through the holes in the shirt collar, by the less luxuriance of the wig, and by the coniferous trees introduced in the background.

Tullberg's small vellum painting was engraved by Bernigeroth, and published as the frontispiece to the Stockholm and Leipzig editions of the 'Systema Naturæ' issued in the same year, 1748. The engraver did not reverse the portrait, so that the aspect of the figure in the print is the same as in that from Ehrensverd's plate. Bernigeroth states that the original from which he worked was "delin. 1748," and that is probably the date of Prof. Tullberg's painting. The softness in the treatment of the features in that

painting, and reproduced in Bernigeroth's engraving, is probably intended to cover the change that eight years would produce in the face of Linné.

Further modifications were subsequently introduced by Bergquist and Tanje in their engravings after Bernigeroth.

IV. and V. 1747. REHN.

The two sketches by J. E. Rehn, dated 1747, are now known only by reproductions. Rehn was a copper-plate engraver, who was sent by Count Tessin to Paris to study under Le Bas.

The first portrait by Rehn is a full-length sketch of Linné in his every-day dress when he was 40 years old. The original drawing came into the possession of the Right Hon. Henry W. W. Wynne. It was reproduced by J. S. Templeton, and published by Colnaghi for the proprietor in January 1830. I have been unable to discover the original; the representatives of Mr. Wynne cannot discover it in the collections left by him, and Messrs. Colnaghi know nothing of the original. The lithograph represents Linné in a long frock coat, a frock vest, knee breeches, and gaiters buttoned to the knee. He has on a wig, wears a sword, and seems to be meditating under the influence of the *weed*, which he is enjoying from a long-stemmed pipe.

The second sketch is an outline head and shoulders. It is known from a lithographic reproduction which is said to be the "Facsimile d'un profil dessiné d'après nature par J. E. Rehn." In the Royal Library, Stockholm, there is a copy having "en 1747" inserted before "par J. E. Rehn." It seems to me very probable that this profile was made for the medal struck in honour of Linnæus in 1646, and dedicated to Count Tessin by four noblemen. In so far as the portrait on this medal differs from Inlander's medallion it agrees with Rehn's sketch. The die-sinker executed the profile directly on the metal, and the portrait on the medal came out reversed. The discrepancy in the dates is not serious, and the likelihood of Rehn's desire to acknowledge in some way his gratitude to Count Tessin favours this suggestion.

VI. 1751. LUNDBERG.

In 1751, or the following year, Gustaf Lundberg made a beautiful pastel portrait of Linné. Lundberg was born in 1695. When he was 22 years of age his master David von Krafft sent him to Paris, where he studied under Rosalba, who introduced pastel painting into France. Lundberg became famous in this art. He returned to Sweden, and in 1750 was appointed painter to the Court. He painted many portraits of the Royal family. Linné resided at the Court at Drottningholm Palace in 1751, and afterwards in 1752 and the beginning of 1753 at Ulriksdal and at Stockholm, being occupied in naming and cataloguing the extensive natural history collections belonging to members of the Royal

family. At one or other of these places the court painter produced this portrait of Linné in his court dress. It is a striking likeness and a beautiful work of art. It is not signed; the artist seldom signed his portraits, but those acquainted with his works are satisfied that this was painted by Lundberg.

Mr. Olof Wijk purchased the painting at the sale in 1888 of the collections of Mr. Bomans, who obtained it from a descendant of Linné. Considerable doubt has been entertained as to this being a portrait of Linné at all. I am, however, able to present some evidence which appears to me to establish that it is a genuine portrait. In the collection of the Linnean portraits in the Royal Library, Stockholm, there is a lithograph by Carl Schroeder, which suggested to me Lundberg's pastel. The lithograph was lettered "Carl von Linnée . . . Das Original-Gemälde befindet sich im Herzoglichen Museum zu Braunschweig." That I might see this painting I went to Brunswick, and found that the painting was a copy of Lundberg's pastel. The entry in the official catalogue stated that this portrait of Linné was a "Brustbild vermuthlich nach einen Pastell gemalde von G. Lundberg." I have no doubt that this is so, and that the original is in the possession of Mr. Wijk.

The Society is indebted to Mr. Wijk for an excellent photograph of this fine portrait. The photograph includes the old frame of the pastel on which are carved the initials of Linné's name.

VII. 1755. SCHEFFEL.

In 1755 J. H. Scheffel, a portrait-painter in Sweden during the first half of the eighteenth century, painted a portrait of Linné when he was 48 years of age. The original painting is at Hammarby. It is a half length ($30\frac{1}{2}$ inches by 25), the face is turned to the left, but the eyes look towards the spectator. In his right hand he holds a *Linnaea*, and the cross of the Polar Star is attached to his coat. On the back of the canvas is written "Carol. Linnaeus. Archiator [*sic*], Professor Upsaliensis, Eques de Stella Polari, nat: 1707 Maj 13. delineatus 1755." In the accurate engraving by I. M. Preisler it is said that his age when the portrait was taken was 55; this is an error.

Dr. Fridr. Ohren of Jerfso, in the province of Helsingland, has a portrait which is claimed to be the original. His wife is a lineal descendant of Linné. It is a copy of Scheffel's painting, and it is not at all likely that it was the work of that painter. The copy has a softer and somewhat meaningless face.

Another copy of Scheffel's portrait was presented to the Smaalands Nationshus, Upsala, by Dr. Nordstedt in 1822. In his history of the Smaalands Nationshus, Palmberg says that this is a copy of Scheffel's picture at Hammarby, and a very poor copy it is.

VIII. 1773. INLANDER.

By command of the King a profile model in wax of Linné was made by Carl Fridr. Inlander in 1773. This medallion is preserved in the house at Hammarby. On the back of it is inscribed in the handwriting of Linné:—

“Carl v. Linné.
1773. Aug. 17.
Carl Fridr. Inlander
bor i Stockholm Giöthgatan;
Glasmastare Skiöld.”

The last three lines were kindly translated for me by Dr. Skottsberg (July 5, 1906)—

Carl Fridr. Inlander
lives in Stockholm, Giöthgatan;
[at] Glassmaker Skiöld.

This must be considered the original portrait, but Inlander produced two replicas: one of these is in the possession of the Royal Academy of Sciences, Stockholm, and the other was presented to the Linnean Society by Sir Joseph Banks on the 2nd February 1790, and is now hanging in our library. These medallions are all certainly by Inlander, and may therefore be looked upon as equally authentic portraits. In a letter from Linné, written on the day after Inlander finished the medallion, he says that Inlander “has modelled me in wax so skilfully that all say they had never seen anything more skilfully done or more like me.”

The reproduction in the royal medal by Liungberger, which was issued in 1778, is far from satisfactory.

Prof. Tullberg has a silhouette reduced to about two-thirds of the original and looking to the left.

The alabaster medallion presented to the Linnean Society by the Medical Society of Stockholm is a reproduction of Inlander's portrait.

The beautiful Wedgwood Cameo was no doubt reproduced from the Inlander medallion in the possession of the Society.

IX. 1774. KRAFFT.

In the following year, 1774, Per Krafft, a famous Swedish painter, and member of the Stockholm Academy, painted a portrait of Linné for the College of Physicians in Stockholm (formerly Sundhets Collegium, now Medicinalen Styrdens), to be placed on the wall of their meeting-room as one of the founders of the College. It is a half-length, nearly full face but turned very little to the left, with the eyes directed towards the spectator. The left hand rests on the back of an octavo volume, holds a plant of *Linnæa*, and partly covers the cross of the Polar Star. The portrait was for some years at the College of Physicians, and was engraved by Akrel in 1797, while it was still there. In March 1890 Prof. Thöre M. Fries informed me that the portrait existed

no more at the College, and where it was gone no one knew. When I visited the College in 1891, the Secretary showed me Eichhorn's catalogue of the portraits in their possession. Under Linnæus by Krafft, it was said that the painting had been lost and it was not known where it now was. I afterwards, with the kindly help of the late Baron Nordenskjöld, made a careful examination of the portraits of Linné at the Royal Academy of Sciences. The well-known portrait presented by the artist, Roslin, to the Academy had the best position on the wall; above it was a copy of the oil-painting belonging to the Zoological Society of Amsterdam, a three-quarters reproduction after the Clifford portrait. Above that, high on the wall, was a portrait which I recognized to be like the engravings of Krafft's painting. I suggested that it might be the lost picture that had belonged to the Medical College. The Baron had it brought down from the wall, and on careful examination we found it was signed and dated "Krafft 1774," and on the back of the canvas was written "Carl v. Linné 1774 ætat. 67." There could be no doubt that this was the lost painting.

Linné had his first paralytic stroke in May 1774, which obliged him to relinquish the more active part of his professorial duties, and to close his literary labours. The portrait exhibits no traces of this malady, and was probably painted before May.

Krafft's portrait may have been in the possession of the Academy of Sciences before 1833, for Adam Afzelius, in his "*Egenhändiga Anteckningar af Linnæus*" published in that year, says (p. 67) that the Royal Academy had Linné's portrait painted to put among its founders, likewise the medallion Akrell had previously made in wax, both very like. But Inlander, not Akrell, was the artist of the medallion. The reference to the portrait may be that of Roslin, but that was not painted for the Academy but was presented to it. If for Royal Academy we substitute Medical College, the statement would apply to Krafft's portrait. But one cannot say from the defective and erroneous statement what Afzelius really meant.

The Linnean Society owes to the generosity of the Royal Academy of Sciences, Stockholm, a faithful reproduction of Krafft's beautiful portrait.

There has just been published an admirable collotype, two-thirds the size of the original, reproduced by J. Cederquist of Stockholm.

There is at the Medical College a copy by John von Breda of this portrait. It is very softly painted; the wrinkles and warts on the face have been omitted. There are also some modifications in the details,—the necklace (?) is tied in a single knot, and the left hand holding the *Linnaea* rests on the page of an open book.

Magnus Hallman, described as a student of Linné, made several copies of Krafft's portrait. Two of these are to be found in the house of Linné at Hammarby. Both are very poor reproductions. One is not signed, the other has on the back of the canvas "Magn. Hallman pinxit 1769." I have no doubt that both of them are posthumous portraits based chiefly on Krafft, but with suggestions

from Roslin and from the engravings after Ehrensverd which appeared in some of Linné's works. The mysterious mass of paint making the portrait appear as if springing out of a cloud, was probably suggested by the academic gown which appears in these engravings.

The small portrait by Hallman, presented to the Society by its former President, Lord Avebury, is a more creditable work. It seems to be influenced more by Roslin than by Krafft.

What appears to me to be a portrait based on the signed painting by Hallman at Hammarby is in the possession of Prof. Tullberg, Upsala. It has no history and the painter is unknown. The artist has tried to get rid of the poor work of Hallman, and has produced a more intellectual looking face, but the features are not those one is familiar with in the authoritative portraits by Scheffel, Inlander, Krafft, and Roslin. The face is shorter and broader than that of Linné, and the nose is too much improved. The cloud-like gown is also introduced.

Prof. Tullberg has a small water-colour portrait which has much in common with his large portrait. It was "delin. 1747" by N. P. Petræus, but it represents a much older man than Linné in his fortieth year.

X. 1775. ROSLIN.

The best known portrait of Linné is that painted by Alexander Roslin in 1775. Roslin was a Swede, born in 1718. He studied in Germany and Italy, and settled in Paris in 1752. He visited Sweden in 1774-75, when he painted portraits of the Royal family and also one of Linné. He died in 1793, being 60 years old.

The portrait of Linné was taken to Paris to finish, and was there engraved by Bervie, under the superintendence of Roslin, at the expense of the Stockholm Academy. The painting was presented by the artist to the Academy in 1779. It is not quite a half-length. The face is turned a little to the left and the eyes look on the spectator. The principal wart is shown on the right cheek on a line with the mouth. The queue of the wig rests on the right shoulder. The lower arm of the cross of the Polar Star has the extremity cut off, and the *Linnaea* rises from the button-hole which carries the ribbon of the cross.

The face was not reversed in Bervie's engraving, but the dress was modified to retain the cross of the Polar Star and the *Linnaea* on the left side.

Roslin painted a replica which he presented to the widow of Linné, who sold it to King Gustaf III., and it was placed by him in the Castle of Gripsholm, where it still remains. I had obtained a photograph of this portrait, which showed it to be an oval. This however is the work of the photographer; the painting in size and in every way agrees with that in the possession of the Academy. On the back of the canvas is written "Carol. v. Linné. natus 1707 Maij 13. delineavit 1775."

Archbishop von Troil commissioned Laurenz Pasch, the younger, to paint for him a portrait of Linné. He copied the Roslin in the Academy, but made his painting a three-quarters length. Linné is seated at a table on which his left hand rests holding a plant of *Linnæa*, which is left out from his coat. The right hand rests on his knee. This painting was presented by the Archbishop to Sir Joseph Banks in acknowledgment of certain civilities shown by Sir Joseph to his son. It was bequeathed to Robert Brown, who presented it to the Linnean Society in 1853; it now hangs in the Library. While it carefully reproduces the likeness by Roslin, the additions which Pasch has made converts Roslin's portrait into a fine picture, and in it the Society possesses the most beautiful memorial of the illustrious naturalist whose name it bears.

The Society has in its possession another painting from the Roslin portrait, presented to the Society in 1814 by Joseph Sabine, one of the original Fellows of the Society. For many years it hung in the meeting-room behind the President's chair, but has been displaced by the reproduction of the Krafft portrait recently presented to the Society. This portrait has no claim to be original. Nothing is known of its history before it came into the possession of the Society. It is without doubt a reproduction in oil of Bervie's or Alix's engraving from Roslin's painting.

The following list gives the materials in the possession of the Linnean Society bearing on the original portraits of Linné:—

1. 1737. 30 years old. HOFFMAN. Photograph of the original painting in the house of Mr. Clifford, Nieuwetsluys, Holland.
2. 1739. 32 years old. J. H. SCHEFFEL. Photograph of the original painting in Linné's house, Hammarby.
3. 1740. 33 years old. AU. EHRENSVERD. Print from the original plate in the possession of Baron Lewenhaupt, Upsala.
4. 1747. 40 years old. J. E. REHN. Full-length facsimile. Original lost, belonged to Rt. Hon. H. W. W. Wynne in 1830.
5. 1747. 40 years old. J. E. REHN. Profile facsimile. It is not known where the original is.
6. 1752. 45 years old. G. LUNDBERG. Photograph of the original pastel in the house of Mr. Olof Wijk, Gothenburg.
7. 1755. 48 years old. J. H. SCHEFFEL. Photograph of the original painting in Linné's house, Hammarby.
8. 1773. 66 years old. C. F. INLANDER. Replica of the original medallion, presented by Sir Joseph Banks, 1790.
9. 1774. 67 years old. P. KRAFFT. Photograph of the original painting, and copy in oil of the original, presented by the Royal Swedish Academy of Sciences, Stockholm.



CARL VON LINNÉ.

From the original by M. Hoffman in the possession of Mr. Clifford,
Nieuwetsluys.



CARL VON LINNÉ.

From the original by J. Scheffel. In Linné's house at Hammarby.



Fig. 1.

From the engraving by Ehrensverd,
"Amica manu sc."



Fig. 2.

From the small painting belonging to
Prof. Tullberg, Upsala.



Fig. 3.

From the lithograph of J. E. Rehn's sketch.
The original is lost.



Fig. 4.

From the facsimile of J. E. Rehn's sketch.



CARL VON LINNE.

From the original by G. Lundberg in the possession of Mr. Olof Wijk, Gothenburg.



CARL VON LINNÉ.

From the original by J. Scheffel. In Linné's house at Hammarby.



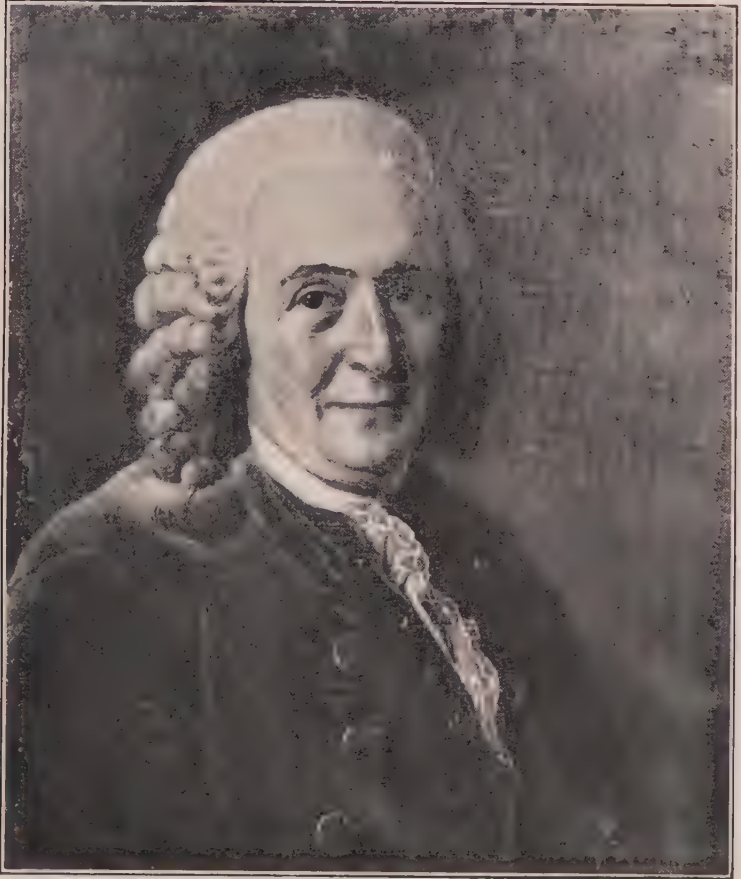
CARL VON LINNÉ.

From the original by C. F. Inlander, at the Linnean Society, London.



CARL VON LINNÉ.

From the original by P. Krafft sen., at the Royal Swedish Academy of Sciences,
Stockholm.



CARL VON LINNÉ.

From the original by A. Roslin at the Royal Swedish Academy of Sciences,
Stockholm.

10. 1775. 68 years old. A. ROSLIN. Photograph of the original painting, and copy in oil of the original, presented by the Royal Swedish Academy of Sciences, Stockholm. And copy by Pasch of the original, presented by Robert Brown, 1853.

A list of the published engravings and lithographs of Linné will be found in the 'Proceedings' of the Society, Session 1888-9, pp. 28-30. This was chiefly based on a collection I made, which was presented to the Society.

EXPLANATION OF PLATES.

CARL VON LINNÉ.

All these reproductions present the same aspect of face and figure as the original paintings or engravings from which they have been taken.

PLATE 1.

From the original by M. Hoffman in the possession of Mr. Clifford, Nieuwetsluys.

PLATE 2.

From the original by J. Scheffel. In Linné's house at Hammarby.

PLATE 3.

Fig. 1. From the engraving by Ehrensverd, "Amica manu sc."

Fig. 2. From the small painting belonging to Prof. Tullberg, Upsala.

Fig. 3. Full length; from the lithograph of J. E. Rehn's sketch. The original is lost.

Fig. 4. Profile bust; from the facsimile of J. E. Rehn's sketch.

PLATE 4.

From the original by G. Lundberg in the possession of Mr. Olof Wijk, Gothenburg.

PLATE 5.

From the original by J. Scheffel. In Linné's house at Hammarby.

PLATE 6.

From the original by C. F. Inlander, at the Linnean Society, London.

PLATE 7.

From the original by P. Krafft, sen., at the Royal Swedish Academy of Sciences.

PLATE 8.

From the original by A. Roslin at the Royal Swedish Academy of Sciences.

BENEFACTIONS.

LIST in accordance with *Bye-Laws, Chap. XVII. Sect. 1, of all Donations of the amount or value of Twenty-five pounds and upwards.*

1790.

The Rt. Hon. Sir Joseph Banks, Bart.

Cost of Copper and engraving of the plates of the first volume of Transactions, 20 in number.

The same: Medallion of C. von Linné, by Inlander.

1796.

The same: a large collection of books.

1800.

Subscription towards the Charter, £295 4s. 6d.

Claudius Stephen Hunter, Esq., F.L.S. (Gratuitous professional services in securing the Charter.)

1802.

Dr. Richard Pulteney.

His collections, and £200 Stock.

Aylmer Bourke Lambert, Esq.

Portrait of Henry Seymer.

1804.

Sir Joseph Banks, Bart.

His collection of Insects.

1807.

Richard Anthony Salisbury, Esq.

Portrait of D. C. Solander, by J. Zoffany.

1811.

Sir Joseph Banks, Bart.

His collection of Shells.

Mrs. Pulteney.

Portrait of Dr. R. Pulteney, by S. Beach.

1814.

Joseph Sabine, Esq.

Portrait of C. von Linné, after Roslin, reversed.

Dr. John Sims.

Portrait of Dr. Trew.

1818.

Subscription of £215 6s. for Caley's Zoological Collection.

1819.

The Medical Society of Stockholm.

A medallion of Linnæus in alabaster.

1822.

Bust of Sir Joseph Banks, by Sir F. Chantrey, R.A.

Subscription of the Fellows.

1825.

The late Natural History Society.

£190, 3½ Stock.

Bust of Sir James Edward Smith, P.L.S., by Sir F. Chantrey,

R.A., by Subscribers.

1829.

Subscription for the purchase of the Linnean and Smithian
Collections, £1593 8s.

1830.

Sir Thomas Grey Cullum, Bart.

£100 Bond given up.

1832.

The Honourable East India Company.

East Indian Herbarium.

1833.

Subscription for Cabinets and mounting the East Indian Herbarium,
£315 14s.

1835.

Subscription portrait of Robert Brown, by H. W. Pickersgill, R.A.

1836.

Subscription portrait of Edward Forster, by Eden Upton Eddis.

Subscription portrait of Archibald Menzies, by E. U. Eddis.

1837.

Subscription portrait of Alexander MacLeay, by Sir Thomas
Lawrence, P.R.A.

1838.

Collections and Correspondence of Nathaniel John Winch.

Portrait of Dr. Nathaniel Wallich, by John Lucas, presented by
Mrs. Smith, of Hull.

1839.

Subscription portrait of William Yarrell, by Mrs. Carpenter.

1842.

David Don: herbarium of woods and fruits.

Archibald Menzies: bequest of £100, subject to legacy duty.

Portrait of John Ebenezer Bicheno, by E. U. Eddis, presented by
Mr. Bicheno.

1843.

Subscription in aid of the funds of the Society, £994 3s.

Subscription portrait of Sir William Jackson Hooker, by S. Gambardella.

1845.

Microscope presented by Subscribers.

1846.

Joseph Janson: £100 legacy, free of duty, and two cabinets.

1847.

[Bequest of £200 in trust, by Edward Rudge; declined as set forth in Proceedings, i. pp. 315-317.]

1849.

Portrait of Sir J. Banks, Bart., by T. Phillips, R.A., presented by Capt. Sir E. Home, Bart., R.N.

1850.

Subscription portrait of the Rt. Rev. Edward Stauley, D.D., Bishop of Norwich, by J. H. Maguire.

1853.

Portrait of Carl von Linné, by L. Pasch, presented by Robert Brown.

Pastel portrait of A. B. Lambert, by John Russell, presented by Robert Brown.

1854.

Professor Thomas Bell, £105.

1857.

Subscription portrait of Prof. T. Bell, P.L.S., by H. W. Pickersgill, R.A.

Thomas Corbyn Janson: two cabinets to hold the collection of fruits and seeds.

Pleasance, Lady Smith: Correspondence of Sir J. E. Smith, in 19 volumes.

1858.

Subscription portrait of Nathaniel Bagshaw Ward, by J. P. Knight.

Subscription for removal to Burlington House, £1108 15s.

Diary of Carl von Linné, and letters to Bishop Menander, presented by Miss Wray.

Dr. Horsfield's Javan plants, presented by the Court of Directors of the Hon. East India Company.

Dr. Ferdinand von Mueller's Australian and Tasmanian plants, including many types.

1859.

Books from the library of Robert Brown, presented by J. J. Bennett, Sec.L.S.

Robert Brown: two bonds given up, £200.

1861.

Subscription bust of Robert Brown, by Peter Slater.

Collection of birds' eggs, bequeathed by John Drey Salmon, F.L.S.

1862.

The Linnean Club: presentation bust of Prof. T. Bell, by P. Slater.

1863.

Subscription portrait of John Joseph Bennett, by E. U. Eddis.

1864.

Beriah Botfield, Esq.: Legacy, £40 less Duty.

1865.

Executors of Sir J. W. Hooker, £100.

George Bentham, Esq.: cost of 10 plates to his "Tropical Leguminosæ," Trans. vol. xxv.

1866.

Dr. Friedrich Welwitsch: Illustrations of his 'Sertum Angolense,' £130.

1867.

George Bentham, Esq.: General Index to Transactions, vols. i.-xxv.

Royal Society: Grant in aid of G. S. Brady on British Ostracoda, £80.

1869.

Carved rhinoceros horn from Lady Smith, formerly in the possession of C. v. Linné.

1874.

Subscription portrait of George Bentham, by L. Dickinson.

George Bentham, Esq., for expenditure on Library, £50.

1875.

Legacy from James Yates, £50 free of Duty.

" " Daniel Hanbury, £100 less Duty.

1876.

Legacy of the late Thomas Corbyn Janson, £200.

" " " Charles Lambert, £500.

George Bentham, Esq.: General Index to Transactions, vols. xxvi.-xxx.

1878.

Subscription portrait of John Claudius Loudon, by J. Linnell.

Subscription portrait of Rev. Miles Joseph Berkeley, by James Peel.

1879.

Rev. George Henslow and Sir J. D. Hooker: Contribution to illustrations, £35.

1880.

The Secretary of State for India in Council: cost of setting up Dr. Aitchison's paper, £36.

1881.

George Bentham, Esq., special donation, £25.

The same: towards Richard Kippist's pension, £50.

Portrait of St. George Jackson Mivart, by Miss Solomon; presented by Mrs. Mivart.

1882.

Executors of the late Frederick Currey: a large selection of books. Subscription portrait of Charles Robert Darwin, by Hon. John Collier.

The Secretary of State for India in Council: Grant for publication of Dr. Aitchison's second paper on the Flora of the Kurrum Valley, £60.

1883.

Sir John Lubbock, Bart. (afterwards Lord Avebury).

Portrait of C. von Linné, ascribed to M. Hallman.

Philip Henry Gosse, Esq.: towards cost of illustrating his paper, £25.

Royal Society: Grant in aid of Mr. Gosse's paper, £50.

Sophia Grover, Harriet Grover, Emily Grover, and Charles Ehret Grover: 11 letters from C. von Linné to G. D. Ehret.

1885.

Executors of the late George Bentham, £567 11s. 2d.¹

Subscription portrait of George Busk, by his daughter Marian Busk.

1886.

A large selection of books from the library of the late Spencer Thomas Cobbold (a bequest for a medal was declined).

Sir George MacLeay, Bart.: MSS. of Alexander MacLeay and portrait of Rev. William Kirby.

1887.

William Davidson, Esq.: 1st and 2nd instalments of grant in aid of publication, £50.

Francis Blackwell Forbes, Esq., in aid of Chinese Flora, £25.

1888.

The Secretary of State for India in Council: Grant in aid of publication of results of the Afghan Boundary Delimitation Expedition, £150.

Dr. J. E. T. Aitchison, towards the same, £25.

Trustees of the Indian Museum: Mergui Archipelago report, for publication in Journal, £135.

Dr. John Anderson, for the same, £60.

Wm. Davidson, Esq.: 3rd and last instalment, £25.

1889.

Bronze copy of model for Statue of C. von Linné, by J. F. Kjellberg ;
presented by Frank Crisp, Esq.

1890.

The Secretary of State for India in Council : Grant for Delimitation
Expedition report, £200.

Oak table for Meeting Room, presented by Frank Crisp, Esq.

Subscription portrait of Sir Joseph Dalton Hooker, K.C.S.I., by
Hubert Herkomer, R.A.

Executors of the late John Ball, Esq. : a large selection of books.

An anonymous donor, £30.

Colonel Sir Henry Collett, K.C.B., towards the publication of his
Shan States collections, £50.

1891.

Subscription portrait of Sir John Lubbock, Bart. [Lord Avebury],
by Leslie Ward.

George Frederick Scott Elliot, Esq., towards cost of his Madagascar
paper, £60.

1892.

Dr. Richard Charles Alexander Prior : projection lantern, £50.

1893.

Executors of Lord Arthur Russell : his collection of portraits of
naturalists.

Electric light installation : cost borne by Frank Crisp, Esq.

1894.

Algernon Peckover, Esq., Legacy, £100 free of Duty.

Miss Emma Swan, " Westwood Bequest," £250.

1896.

Clock and supports in Meeting Room, presented by Frank Crisp,
Esq.

1897.

William Carruthers, Esq. : Collection of engravings and photo-
graphs of portraits of Carl von Linné.

Royal Society : Grant towards publication of paper by the late
John Ball, £60.

Subscription portrait of Professor George James Allman, by
Marian Busk.

1898.

Sir John Lubbock, Bart. : Contribution towards his paper on
Stipules, £43 14s. 9d.

Royal Society : Contribution towards Cole's paper, £50.

"	"	"	"	Murray & Blackman's paper, £80.
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"	"	"	"	Elliot Smith's paper, £50.
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1899.

A. C. Harmsworth, Esq. : Contribution towards cost of plates, £43.
 Royal Society : Contribution towards Mr. R. T. Günther's paper
 on Lake Urmi, £50.

1901.

Hon. Charles Ellis, Hon. Walter Rothschild, and the Bentham
 Trustees : The Correspondence of William Swainson.
 Royal Society : Contribution towards F. Chapman's paper on
 Funafuti Foraminifera, £50.
 Prof. E. Ray Lankester : Contribution towards illustration, £30 5s.
 Portrait of St. G. J. Mivart ; presented by Mrs. Mivart.

1903.

Royal Society : Contribution toward Elliot Smith's paper, £50.
 Legacy from the late Dr. R. C. A. Prior, £100 free of duty.
 Mrs. Sladen : Posthumous Portrait of the late Walter Percy
 Sladen, by H. T. Wells, R.A.
 B. Arthur Bensley : Contribution to his paper, £44.

1904.

Royal Society : Grant in aid of third volume of the Chinese Flora,
 £120.
 Supplementary Royal Charter : cost borne by Frank Crisp, Esq.

1905.

Royal Society : First grant in aid of Dr. G. H. Fowler's 'Biscayan
 Plankton,' £50.
 Executors of the late G. B. Buckton, Esq. : Contribution for
 colouring plates of his paper, £26.

1906.

Royal Society : Second grant to 'Biscayan Plankton,' £50.
 Subscription portrait of Prof. S. H. Vines, by Hon. John Collier.
 Royal Swedish Academy of Sciences : Copies of portraits of C. von
 Linné, after Per Kräfft the elder, and Alexander Roslin, by
 Jean Haagen.

ADDITIONS AND DONATIONS

TO THE

LIBRARY

1905-1906.

Achával (Luis). *See* **Río (Manuel E.).** Geografía de la Provincia de Córdoba.

Agricultural (The) Journal of India.

Vol. I., Part 1»

8vo. *Calcutta*, 1906.

Albert, Honoré Charles (Prince de Monaco). Résultats des Campagnes Scientifiques accomplies sur son Yachts [*l'Hirondelle* et *la Princesse-Alice*]. Fascicules 31-32. 4to. *Monaco*, 1905.

XXXI. Description des encéphales de *Grampus griseus* Cuv., de *Steno frontatus* Cuv., et de *Globicephalus melas* Traill, provenant des Campagnes du Yacht *Princesse-Alice*. Par AUGUSTE PETTIT. (1905.)

XXXII. Mollusques provenant des dragages effectués a l'Ouest de l'Afrique pendant les Campagnes Scientifiques de S. A. S. le Prince de Monaco. Par PHILIPPE DAUTZENBERG et HENRI FISCHER. Pp. 125; plates 5. (1906.)

Alcock (Alfred William). Catalogue of the Indian Decapod Crustacea in the Collection of the Indian Museum. Part III. *Macrura*. Fasciculus I. The Prawns of the *Peneus* Group. *See Calcutta: Indian Museum*.

— *See* **Maldivé and Laccadive Archipelagoes.** Marine Crustaceans: Paguridæ.

Ameghino (Florentino). La perforación astragaliana en *Prodonotes*, *Canis (Chrysocyon)*, y *Typotherium*. Pp. 19; figs. 15. (An. Mus. Nac. Buenos Aires, xiii.) 8vo. *Buenos Aires*, 1905.

— La perforation astragalienne sur quelques Mammifères du Miocène Moyen de France. Pp. 18; figs. 12. (An. Mus. Nac. Buenos Aires, xiii.) 8vo. *Buenos Aires*, 1905.

— La perforación astragaliana en el *Orycteropus* y el Origen de los *Orycteropidæ*. Pp. 37; figs. 31. (An. Mus. Nac. Buenos Aires, xiii.) 8vo. *Buenos Aires*, 1905.

— Enumeración de los impennes fósiles de Patagonia y de la Isla Seymour. Pp. 71; plates 8, figs. 4. (An. Mus. Nac. Buenos Aires, xiii. pp. 97-167.) 8vo. *Buenos Aires*, 1905.

— Les Edontés fossiles de France et d'Allemagne. Pp. 76; figs. 61. (An. Mus. Nac. Buenos Aires, xiii. pp. 175-250.)

8vo. *Buenos Aires*, 1905. Author.

Andrews (Charles William). *See* **British Museum.** Fossils. A Descriptive Catalogue of the Tertiary Vertebrata of the Fayûm Egypt.

- Antarctique Expédition Belge.** *See* Belgica.
- Aquila:** a Periodical of Ornithology. Edited by OTTO HERMAN.
Vols. XI., XII. 4to. *Budapest*, 1904-1905.
- Arber** (Edward Alexander Newell). *See* British Museum.
Fossils. Catalogue of the Fossil Plants of the *Glossopteris*
Flora in the Depart. of Geology, British Museum (Natural
History).
- Archiv für Hydrobiologie und Planktonkunde.** Herausgegeben
von Dr. OTTO ZACHARIAS.
Band I. 8vo. *Stuttgart*, 1905-1906.
- Arens (C.).** Observations on the Spawning Season of the Rainbow
Trout. Pp. 5. (Rept. Fisheries Ireland, Sci. Investig., 1904,
vii.) 8vo. *Dublin*, 1906.
- Australian Naturalist.** Journal and Magazine of the New South
Wales Naturalists' Club.
Vol. I., Part 1. 8vo. *Sydney, N.S.W.*, 1906.
- Avebury** (*Right Hon. John, Lord*). *See* Lubbock (*Sir John*).
- Baldrey (F. S. H.).** *See* Journal of Tropical Veterinary Science.
- Banker** (Howard James). A Contribution to a Revision of the
North-American Hydnaceæ. Pp. 96. (Mem. Torrey Bot.
Club, xii.) 8vo. *New York*, 1906.
- Bastian** (Henry Charlton). The Nature and Origin of Living
Matter. Pp. 344; plates 32. 8vo. *London*, 1905. **Author.**
- Bell** (Francis Jeffrey). *See* Maldive and Laccadive Archipelagoes.
Actinogonidiate Echinoderms.
- Beneden** (Pierre Joseph van). Mémoire sur les Vers Intestinaux.
Pp. viii, 376; avec 27 planches. 4to. *Paris*, 1858.
N. H. W. Maclaren.
- Berg (L. S.).** On the Distribution of *Cottus poecilopus*, Heck., in
Siberia. Pp. 17. (Trav. Sous-Section Troïtskosawsk-Kiakhta,
Soc. Impér. Russe Géographique, vii. Livr. 1, pp. 78-92.)
8vo. *St. Petersburg*, 1905. **Author.**
- Bergh** (Rudolph). Die Opisthobranchiata der Siboga-Expedition.
See Siboga-Expeditie. Monogr. L.
- Bibliotheca Botanica** (*continued*).
Heft 63. LOHAUSS (KARL). Der anatomische Bau der Laubblätter der
Festucaceen und dessen Bedeutung für die Systematik.
Pp. vi, 114; mit 16 Tafeln. 1905.
- Bibliotheca Zoologica** (*continued*).
Band XIX. Heft 45, Liefg. 1. FISCHER (GUIDO). Vergleichend-anatom-
ische Untersuchungen über den Bronchialbaum
der Vögel. Pp. 45; mit 5 Tafeln und 2 Text-
figuren. 1905.
" " 46¹. WAGNER (M.). Psychobiologische Untersuchungen
an Hummeln. 1906.
" " 47. KUPELWIESER (HANS). Untersuchungen über den
feineren Bau und die Metamorphose des *Cypho-
nautes*. Pp. 50; plates 5. 1906.
" " 48. BORCHERDING (FRIEDRICH). Achatinellen-Fauna der
Sandwich-Insel Molokai, &c. Pp. 195; Taf. 10,
and Map. 1906.

- Biehringer (Joachim).** Beiträge zur Anatomie und Entwicklungsgeschichte der Trematoden. Inaugural-Abhandlung. Pp. 26. (Arb. zool.-zoot. Inst. Würzburg, vii.)
8vo. *Wiesbaden*, 1884. **N. H. W. MacLaren.**
- Bohny (Paul).** Beiträge zur Kenntnis des Digitalisblattes und seiner Verfälschungen mit Berücksichtigung des Pulvers. Inaugural-Dissertation. Pp. 61; plates 3. 8vo. *Basel*, 1906.
Dr. Hans Schinz.
- Bolus (Harry).** Contributions to the African Flora. Pp. 18. (Trans. South Afric. Phil. Soc. xvi.)
8vo. *Cape Town*, 1905. **Author.**
- Sketch of the Floral Regions of South Africa. Pp. 42, and Map. (Science in South Africa, Aug. 1905.)
8vo. *Cape Town*, 1905. **Author.**
- Boman (E.).** Deux *Stipa* de l'Amérique du Sud développant de l'acide cyanhydrique. Pp. 7. (Bull. Mus. d'Hist. Nat. 1905, no. 5, p. 337.)
8vo. *Paris*, 1905. **Author.**
- Bonnier (Gaston) et Sablon (Leclerc du).** Cours de Botanique. Vol. I. Pp. 1328; figs. 2389. 8vo. *Paris*, 1901-1905.
- Borcea (I.).** Recherches sur les système uro-genital des Elasmobranches. Pp. 238; plates 2, figs. 103. (Arch. Zool. Expér. 4 ser. iv.)
8vo. *Paris*, 1906.
- Borcherding (Friedrich).** Achatinellen-Fauna der Sandwich-Insel Molokai, nebst einem Verzeichnis der übrigen daselbst vorkommenden Land- und Süßwassermollusken. Pp. 195; Taf. 10, and Map. (Zoologica, Heft 48.) 4to. *Stuttgart*, 1906.
- Borger (Adolf).** See **Plankton-Expedition.** Die Tripyleen Radiolarien: Atlanticellidæ.
- Borgström (Ernst).** Ueber *Echinorhynchus turbinella*, *brevicollis*, und *porrigens*. Pp. 60; Taf. 5. (Bih. K. Sv. Vet.-Akad. Handl. xvii. Afd. iv. no. 10.)
8vo. *Stockholm*, 1892.
N. H. W. MacLaren.
- Borradaile (Lancelot Alexander).** See **Maldives and Laccadive Archipelagoes.** Hydroids.
—— Land Crustaceans.
—— Marine Crustaceans.
- Bose (Jagadis Chunder).** Plant Response as a Means of Physiological Investigation. Pp. xxxviii, 781; figs. 278.
8vo. *London*, 1906. **Frank Crisp.**
- Bouvier (Eugène L.).** Monographie des Onychophores. Pp. 383; plates 13, figs. 140. (Ann. Sci. Nat., Zool. 9 ser. ii.)
8vo. *Paris*, 1905.
- See **Gruvel (Abel).** Monographie des Cirrhipèdes ou Thécostracés.
- British Association for the Advancement of Science.**
Report (South Africa), 1905. 8vo. *London*, 1906.
Council Brit. Assoc.

British Museum (*continued*).

INSECTS.

Homopterous Insects.

- A Synonymic Catalogue of Homoptera. By W. L. DISTANT.
Pp. 207. 8vo. London, 1906.

ANTHOZOA.

- Catalogue of the Madreporarian Corals in the British Museum (Natural History). Vol. V. The Family Poritidæ.—II. The Genus *Porites*. Part I. *Porites* of the Indo-Pacific Region. By HENRY M. BERNARD. Pp. vi, 303; plates 35. 1905.

FOSSILS.

- A Descriptive Catalogue of the Tertiary Vertebrata of the Fayûm, Egypt. By CHARLES WILLIAM ANDREWS. Pp. xxxvii, 324; figs. 98, plates 27. 4to. London, 1906.
- Catalogue of the Fossil Plants of the *Glossopteris* Fauna in the Department of Geology, British Museum (Natural History). Being a Monograph of the Permo-Carboniferous Flora of India and the Southern Hemisphere. By EDWARD ALEXANDER NEWELL ARBER. Pp. lxxv, 255; plates 8. 1905.
- Britten (James). "Botany in England." Being some Comments on Prof. F. W. Oliver's Address so entitled delivered to the Botanical Section of the British Association at York, 1906. Pp. 5. (Journ. Bot. vol. xlv. pp. 310-314.) 8vo. London, 1906. Author.

Brooklyn.**Brooklyn Institute of Arts and Sciences.**

Cold Spring Harbor Monographs. No. 6.

8vo. Brooklyn, 1906.

6. WALTER (HERBERT E.). The Behaviour of the Pond Snail, *Lymnæus elodes*, Say. Pp. 35. (1905.)

Browne (Edward T.). See **Maldive and Laccadive Archipelagoes.** Hydromedusæ.

——— Scyphomedusæ.

Bruce (Alexander). See **Wright (Herbert).** Para Rubber in Ceylon.**Buchanan (Francis).** See **Prain (David).** A Sketch of the Life of Francis Hamilton (once Buchanan).**Buchenau (Franz).** Juncaceæ. Pp. 284, figs. 121; mit 777 Einzelbildern. See **Engler (H. G. A.).** Das Pflanzenreich etc. Heft 25 (iv. 36). 8vo. Leipzig, 1906.**Budapest.** See **Aquila.****Bürger (Otto).** See **Berlin**—Das Tierreich. Liefg. 20. Platyhelminthes: Nemertini.**Buitenzorg.**

Département de l'Agriculture aux Indes Néerlandaises.

Bulletin, Nos. 1-3.

8vo. Buitenzorg, 1906.

Buitenzorg (*continued*).

's Lands Plantentuin.

Icones Bogoricensis. Vols. I.-II. fasc. 1.

8vo. *Batavia, Leide*, 1897-1903.

Bulawayo.

Rhodesia Scientific Association.

Proceedings, Vols. I.-V. Part 1.

8vo. *Bulawayo*, 1903-1905. **Dr. P. L. Sclater.**

Bullen (Robert Ashington). Land and Fresh-water Mollusca from Sumatra. Pp. 5; plate 1. (Proc. Malacol. Soc. vii. Part. 1.)

8vo. *London*, 1906.

— Holocene Deposit at Harlton. Pp. 3, fig. 2. (Proc. Malacol. Soc. vii. Part 2.)

8vo. *London*, 1906.

— Microzoa and Mollusca from East Crete. Pp. 5; plates 5. (Geol. Mag., n. s. Decade 5, vol. iii. pp. 353-358.)

8vo. *London*, 1906. **Author.**

Burgess (Edward Sandford). Studies in the History and Variations of Asters. Part II. Species and Variations of Biotian Asters, with Discussion of Variability in *Aster*. Pp. xv, 419; plates 13, figs. 108. (Mem. Torrey Bot. Club, xiii.)

8vo. *New York*, 1906.

Burr (Malcolm). See *Maldive and Laccadive Archipelagoes*. Orthoptera.

Buttel-Reepen (H. von). Zur Kenntniss der Gruppe des *Distomum clavatum*, insbesondere des *Dist. ampullaceum* und des *Dist. Siemersi*. Pp. 72; plates 5. (Zool. Jahrb., Abt. Syst. xvii.)

8vo. *Jena*, 1902. **N. H. W. Maclaren.**

Byrne (L. W.). See **Holt** (Ernest W. L.). First Report on the Fishes of the Irish Atlantic Slope.

Calcutta.

Asiatic Society of Bengal.

Memoirs, Vol. I.

4to. *Calcutta*, 1905-1906.

Indian Museum.

Catalogue of the Indian Decapod Crustacea in the Collection of the Indian Museum. Part III. Macrura. Fasciculus I.

The Prawns of the *Peneus* Group. By A. ALCOCK. Pp. ii, 55; plates 9.

4to. *Calcutta*, 1906.

Calman (William Thomas). The Cumacea of the Siboga Expedition. See *Siboga-Expeditie*, Livr. 23.

Cameron (Peter). See *Maldive and Laccadive Archipelagoes*. Hymenoptera.

Campbell (Douglas Houghton). The Structure and Development of Mosses and Ferns (Archegoniatae). 2nd Edition. Pp. vii, 657.

8vo. *New York & London*, 1905.

Cape Town.

South African Museum.

Report for 1905.

fol. *Cape Town*, 1906.

Casado (Manuel). Estudio sobre la enfermedad de los Naranjos y Limoneros de la Provincia de Málaga. Pp. 28.

8vo. *Malaga*, 1886. Don José Luis A. de Linera.

Cash (James) and Hopkinson (John). The British Freshwater Rhizopoda and Heliozoa. Vol. I. Rhizopoda. Part I. Pp. x, 148; plates 1-16. (*Ray Society*.) 8vo. *London*, 1905.

Ceylon—Royal Botanic Gardens. See Pérádeniya.

Chalubinski (Tytus). Enumeratio Muscorum Frondosorum Tatrensiu hucusque cognitorum. Pp. viii, 207, and Map.

4to. *Warsawa*, 1886. Dr. R. Braithwaite.

Chapman (Frederick). Notes on the older Tertiary Foraminiferal Rocks on the West Coast of Santo, New Hebrides. Pp. 14; plates 4. (*Proc. Linn. Soc. N. S. Wales*, xxx.)

8vo. *Melbourne*, 1905. Author.

— New or Little-known Victorian Fossils in the National Museum, Melbourne.

Part V. On the Genus *Receptaculites*. With a Note on *R. australis* from Queensland. Pp. 11; plates 3.

Part VI. Notes on Devonian Spirifers. Pp. 4; plate 1.

(*Proc. Roy. Soc. Victoria*, xviii, pt. 1.)

8vo. *Melbourne*, 1905. Author.

Part VII. A new Cephalaspid, from the Silurian of Wombat Creek. Pp. 8; plates 2. (*Proc. Roy. Soc. Victoria*, N.S. xviii.)

8vo. *Melbourne*, 1906. Author.

Collinge (Walter Edward). See *Journal of Economic Biology*. Edited by W. E. COLLINGE.

Colombo—Royal Botanic Gardens. See Pérádeniya.

Contemporary Science Series. Edited by HAVELOCK ELLIS.

8vo. *London*, 1889-1893.

GEDDES (P.) and THOMSON (J. A.). The Evolution of Sex. (1889).

WEISMANN (A.). The Germ-Plasm: a Theory of Heredity. (1893.)

Cooper (C. Forster). See *Maldivé and Laccadive Archipelagoes*. Antipatharia.

— Cephalochorda. Syst. and Anatomical Account.

Corrado (Parona). Dialeuni Elminti raccolti nel Sudan Orientale da O. BECCARI e P. MAGRETTI. Pp. 24, Tav. 2. (*Ann. Mus. Genova*, ser. 2, vol. ii.)

8vo. *Genova*, 1885.

N. H. W. MacLaren.

Coutière (H.). See *Maldivé and Laccadive Archipelagoes*. Marine Crustaceans—Alpheidæ.

Cristofoletti (Ugo). Studien über *Rheum rhaponticum*. Inaugural-Dissertation. Pp. 63; plates 5.

8vo. *Bern*, 1905.

Dr. Hans Schinz.

- Cunnington (William A.).** Studien an einer Daphnide, *Simoccephalus sima*. Beiträge zur Kenntniss des Centralnervensystems und der feineren Anatomie der Daphniden. Inaugural-Dissertation. Pp. 75; mit 3 Tafeln und 6 Textfiguren. 8vo. *Jena*, 1902. **N. H. W. Maclaren**
- Dautzenberg (Philippe).** Mollusques provenant des dragages effectués à l'Ouest de l'Afrique pendant les Campagnes Scientifiques de S.A.S. le Prince de Monaco. *See Albert.*
- Dawe (Morley Thomas).** Report on a Botanical Mission through the Forest Districts of Buddu and the Western and Nile Provinces of the Uganda Protectorate. Pp. 63; plates 5, and Map. fol. *London*, 1906. **Author.**
- Deane (Ruthven).** Letters from William Swainson to John James Audubon. (Hitherto unpublished Letters.) Pp. 11. (The 'Auk,' xxii. pp. 248-258). 8vo. *New York*, 1905. **Author.**
- Degen (Arpád von).** Ueber das spontane Vorkommen eines Vertreters der Gattung *Sibiraea* in Südkroatien und in der Hercegovina. Pp. 15. (Ungarische Bot. Blätter, Jahrg. 1905, No. 8/10.) 8vo. *Budapest*, 1905.
- De Toni (Giovanni Battista).** Sulla *Griffithsia acuta*, Zanard. herb. Pp. 5. (Nuovo Notarisia, xvii.) 8vo. *Padova*, 1905.
- Sylloge Algarum omnium hucusque cognitarum. Vols. I.-IV. Patavii, 1889-1905. Notice of, by **MARTIN MÖBIUS**. Pp. 3. (Naturwiss. Wochenschr. xx.) 4to. *Jena*, 1905.
- Sul Reagente di Schweizer. Nota, pp. 4. (Atti R. Ist. Veneto, vol. 65.) 8vo. *Venezia*, 1906. **Author.**
- Diels (Ludwig).** Die Pflanzenwelt von West-Australien südlich des Wendekreises. Pp. xii, 413, mit 1 Vegetations-Karte und 82 Figuren im Text, sowie 34 Tafeln. (Engler-Drude, Vegetation der Erde, vii.) 8vo. *Leipzig*, 1906.
- Distant (William Lucas).** *See British Museum.* Homopterous Insects. A Synonymic Catalogue of Homoptera.
- *See Maldive and Laccadive Archipelagoes.* Rhynchota.
- Dode (L. A.).** Extraits d'une Monographie inédite du Genre "*Populus*." Pp. 73, plates 2. (Mém. Soc. d'Hist. Nat. Autun, xviii.) 8vo. *Autun*, 1905. **Author.**
- Procédés de transport des Graines et des Boutures. Pp. 2. (Rev. Horticole, No. 1.) 8vo. *Orléans*, 1906.
- Doncaster (Leonard).** *See Maldive and Laccadive Archipelagoes.* Chaetognatha.
- Drabble (Eric).** A Note on Vascular Tissue. Pp. 5. (New Phytol. iv.) 8vo. *London*, 1905. **Author.**
- Drabble (Eric) and Lake (Hilda).** On the Effect of Carbon Dioxide on Geotropic Curvature of the Roots of *Pisum sativum* L. Pp. 8. (Proc. Roy. Soc. B. vol. 76.) 8vo. *London*, 1905. **Authors.**
- The Osmotic Strength of Cell-Sap in Plants growing under different Conditions. Pp. 3. (New Phytol. iv.) 8vo. *London*, 1905. **Authors.**

Dublin.

Department of Agriculture and Technical Instruction for
Ireland. Fisheries Branch.

Scientific Investigations :

1902-1903. Nos. 1, 2, 3, 7, 10, 11. (1905).

1904. Nos. 3-7. (1905-6).

1905. No. 2. (1906).

8vo. *Dublin*, 1905-1906.

Authors and Scientific Adviser.

Royal Zoological Society of Ireland.

Annual Report, 74.

8vo. *Dublin*, 1905.

Dunn (Stephen Troyte). Alien Flora of Britain. Pp. xvi, 208.

8vo. *London*, 1905. Author.

Durand (Théophile) and Jackson (Benjamin Daydon). Index
Kewensis Plantarum Phanerogamarum. Supplementum Pri-
mum Nomina et Synonyma Omnium Generum et Specierum
ab initio anni 1886 usque ad finem anni 1895 complectens.
Fasciculus IV. 4to. *Bruxellis*, 1906. B. Daydon Jackson.

Duss (Le R. P.). Flore phanérogamique des Antilles Françaises
(Guadeloupe et Martinique)... Avec annotations du ... E.
HECKEL sur l'emploi de ces Plantes. Pp. xxviii, 656. (Ann.
Inst. Colonial Marseilles, iii.) 8vo. *Marseilles*, 1897.

— Flore Cryptogamique des Antilles Françaises. Pp. 360.

8vo. *Lons-le-Saunier*, 1904.

Duthie (John F.). See Strachey (Sir Richard). Catalogue of the
Plants of Kumaon, &c.

Dyer (Sir William Turner Thiselton-). See Oliver (D.). Flora of
Tropical Africa.

Eichler (Julius), Gradmann (Robert), und Meigen (Wilhelm).
Ergebnisse der pflanzengeographischen Durchforschung von
Württemberg, Baden und Hohenzollern. I. Pp. 78, mit 2
Karten. (Beilage z. Jahresh. Ver. Vaterl. Naturk. Württemberg.
Jahrg. 61.) 8vo. *Stuttgart*, 1905.

Eisig (Hugo). *Ichthyotomus sanguinarius*. Eine auf Aalen
schmarotzende Annelide. Pp. xi, 300; mit 10 Taf. und 34
Textfig. See Naples: Zoological Station. Monogr. xxviii.

Eliot (Sir Charles). See Maldive and Laccadive Archipelagoes.
Nudibranchiata.

Elliot (George Francis Scott). A First Course in Practical
Botany. Pp. viii, 344, figs. 158. 8vo. *London*, 1906. Author.

Engler (Adolf). Das Pflanzenreich. Regni vegetabilis conspectus.
.... Herausgegeben von A. ENGLER. Hefte 1-22.

8vo. *Leipzig*, 1900-1905.

— Syllabus der Pflanzenfamilien. Vierte, umgearbeitete
Auflage. Pp. xviii, 237. 8vo. *Berlin*, 1904.

Engler (Adolf) und Drude (Oscar). Die Vegetation der Erde. VII.
8vo. *Leipzig*, 1906.

VII. Die Pflanzenwelt von West-Australien südlich des Wendekreises,
von Dr. LUDWIG DIELS. Pp. xii, 413; mit 1 Vegetations-Karte
und 82 Figuren im Text, sowie 34 Tafeln. (1906.)

English Men of Science. Edited by JOSEPH REYNOLDS GREEN.

8vo. *London*, 1906.

BENTHAM (GEORGE). By B. DAYDON JACKSON. Pp. xii, 292, and
Portrait. (1906.)

B. D. JACKSON.

Everett (W. H.). Memorandum on Mechanical Tests of some
Indian Timbers. Pp. 7. (Forest Bull. no. 6.)

8vo. *Calcutta*, 1906.

Farlow (William Gilson). Bibliographical Index of North
American Fungi. Vol. I. Part 1. (Carnegie Institution of
Washington. Public. No. 8.)

8vo. *Washington*, 1905. Author.

Federley (Harry). Lepidopterologische Temperatur-Experimente
mit besonderer Berücksichtigung der Flügelschuppen. Pp. 117;
mit 3 Tafeln und 7 Abbildungen im Text. (Festschrift f.
Palmen, no. 16.) 4to. *Helsingfors*, 1905. Lord Avebury.

Fischer (Guido). Vergleichend-anatomische Untersuchungen über
den Bronchialbaum der Vögel. Pp. 45; mit 5 Tafeln und 2
Textfiguren. (Zoologica, Heft 45, Bd. xix, Liefg. 1.)

4to. *Stuttgart*, 1905.

Fischer (Henri). Mollusques provenant des dragages effectués a
l'Ouest de l'Afrique pendant les Campagnes Scientifiques de
S. A. S. le Prince de Monaco. See Albert.

Fischer (Paul Moritz). Ueber den Bau von *Opisthotrema cochleare*,
nov. genus, nov. spec. Ein Beitrag zur Kenntniss der Tremato-
toden. Inaugural-Dissertation. Pp. 42, Taf. 1. (Zeitschr. wiss.
Zool. Band 40.) 8vo. *Leipzig*, 1883. N. H. W. MacLaren.

Fisheries.

North Sea Fisheries Investigation Committee.

FISHERY BOARD FOR SCOTLAND.

Report on Fishery and Hydrographical Investigations in the
North Sea and Adjacent Waters. Conducted for the
Fishery Board for Scotland in co-operation with the Inter-
national Council for the Exploration of the Sea under
the Superintendence of D'ARCY WENTWORTH THOMPSON.
1902-03. fol. *London*, 1905.

North Sea Fisheries Investigation Committee.

MARINE BIOLOGICAL ASSOCIATION OF THE UNITED KINGDOM.
International Fishery Investigations.

First Report on Fishery and Hydrographical Investigation
in the North Sea and Adjacent Waters (Southern Area).
Conducted for His Majesty's Government by the Marine
Biological Association of the United Kingdom. 1902-03.
fol. *London*, 1905.

North Sea Fisheries Investigation Committee.

Fletcher (James). Canada Department of Agriculture Central
Experimental Farm. Report of the Entomologist and Botanist.
(Ann. Rep. Exper. Farm, 1904.) Pp. v, 52, plates 2.

8vo. *Ottawa*, 1905.

- Fletcher (James). Insects injurious to Grain and Fodder Crops, Root Crops, and Vegetables. Pp. 48, plates 8. (Bull. No. 52, Dept. Agric. Centr. Exper. Farm.) 8vo. *Ottawa*, 1905.
- The Division of Insects and Plants. Evidence of JAS. FLETCHER before the Select Standing Committee on Agriculture and Colonization. 1905; pp. 25. 8vo. *Ottawa*, 1905. **Author.**
- Flint (James Monroe). A Contribution to the Oceanography of the Pacific. Pp. 62, plates 14. (Bull. U.S. Nat. Mus. No. 55.) 8vo. *Washington*, 1905.
- Flora and Silva. Edited by WILLIAM ROBINSON. Vol. I. 4to. *London*, 1903. **W. Robinson.**
- Forster-Cooper (C.). *See* Cooper (C. Forster).
- Foslie (M.). *See* Maldive and Laccadive Archipelagoes. Lithothamnium.
- Foslie (M.) and Howe (Marshall A.). New American Coralline Algæ. Pp. 9, plates 14. (Bull. New York Bot. Garden, iv.) 8vo. *New York*, 1906. **Authors.**
- Fries (Robert Elias). Zur Kenntnis der Alpenen Flora im Nördlichen Argentinien. Pp. 205; Taf. 9 and 1 map. (Nova Acta Reg. Soc. Sci. Upsal. ser. 4, vol. i.) 4to. *Upsala*, 1904–1905.
- Gadow (Hans). *See* Maldive and Laccadive Archipelagoes. Aves.
- Garden (The). Vols. 67, 68. 4to. *London*, 1905. **Editors.**
- Gardeners' Chronicle. 3 ser. Vols. 37, 38. fol. *London*, 1905. **Editor.**
- Gardiner (John Stanley). *See* Maldive and Laccadive Archipelagoes.
- Garry (Francis Nicholas Arbuthnot). Notes on the Drawings for Sowerby's 'English Botany.' Pp. 276. (Journ. Bot. vols. 41 & 42.) 8vo. *London*, 1903–1905.
- Ghorozhankin (Ivan Nikolaevich). On the Corpuscles and Sexual Process in Gymnospermous Plants. Pp. 174, plates 9. (Proc. Imper. Moscow Univ., i.) (*In Russian.*) 8vo. *Moscow*, 1880.
- Beiträge zur Kenntnis der Morphologie und Systematik der Chlamydomonaden. (Bull. Soc. Impér. Moscou, n. s. vols. iv. & v.) 8vo. *Moscow*, 1890–91.
- I. *Chlamydomonas Braunii* (mihi).
- II. *Chlamydomonas Reinhardtii* (Dangeard) und seine Verwandten.
- Ueber den Befruchtungs-Process bei *Pinus Pumilio*. Pp. 4. 8vo. *Strassburg*, 1883.
- Glasgow.
- Marine Biological Association of the West of Scotland. Annual Report for 1905. 8vo. *Glasgow*, 1906. **The Director.**
- Goebel (Karl). Zur Erinnerung an K. F. PH. v. MARTIUS. Gedächtnisrede bei Enthüllung seiner Büste im K. Botanischen Garten in München am 9. Juni, 1905. Pp. 20. 4to. *München*, 1905.

- Goroschankin or Goroshankin. *See* Ghorozhankin (Ivan Niko-laevich).
- Goto (Seitaro). On *Diplozoon nipponicum*, n. sp. Pp. 42; plates 3. (Journ. Sc. Coll. Tokyo, iv.) 8vo. *Tokyo*, 1890.
- Studies on the Ectoparasitic Trematodes of Japan. Pp. 273; plates 27. (Journ. Coll. Sc. Tokyo, viii.) 4to. *Tokyo*, 1894. N. H. W. Maclaren.
- Gough (Lewis Henry). Plankton collected at Irish Light Stations in 1904. Pp. 55. (Rept. Fisheries Ireland, Sci. Investig., 1904, vi.) 8vo. *Dublin*, 1906. Author.
- Gradmann (Robert). *See* Eichler (Julius). Ergebnisse der pflanzengeographischen Durchforschung von Württemberg, Baden und Hohenzollern, I.
- Gray (Asa). *See* Sullivant (William Starling). Icones Muscorum, Supplement.
- Green (Joseph Reynolds). *See* English Men of Science. Edited by J. REYNOLDS GREEN.
- Gross (J.). Untersuchungen über die Histologie des Insecten-ovariums. Pp. 116; Taf. 9. (Zool. Jahrb., Abt. Anat. xviii. pp. 72-186, Taf. 6-14.) 8vo. *Jena*, 1903.
- Die Spermatogenese von *Syromastes marginatus*, L. Pp. 60; Taf. 2. (Zool. Jahrb., Abt. Anat. xx.) 8vo. *Jena*, 1904. N. H. W. Maclaren.
- Gruvel (Abel). Monographie des Cirrhipèdes ou Thécostracés. Préface de EUGÈNE L. BOUVIER. Pp. xii, 472; avec 427 figures dans le texte. 8vo. *Paris*, 1905.
- Guppy (Robert John Lechmere). The Growth of Trinidad. Pp. 13; figs. 8, map 1. (Trans. Canad. Inst. viii.) 8vo. *Toronto*, 1905. Author.
- Gurley (Revere Randolph). The Myxosporidia, or Psorosperms of Fishes, and the Epidemic produced by them. Pp. 239; plates 47. (U.S. Commission on Fish and Fisheries, Commissioner's Rept., Part 18, for 1902.) 8vo. *Washington*, 1904.
- Haass (Everhard). Beitrag zur Kenntniss der Actinomyceten. Inaugural-Dissertation. Pp. 81. 8vo. *Zürich*, 1905. Dr. Hans Schinz.
- Haberlandt (Gottlieb). Die Lichtsinnes-organe der Laubblätter. Pp. viii, 142; mit 8 Textfig. & 4 Taf. 8vo. *Leipzig*, 1905.
- Haeckel (Ernst Heinrich). Last Words on Evolution. A Popular Retrospect and Summary. Translated from the Second Edition by JOSEPH McCABE. Pp. 127, with Portrait and Three Plates. 8vo. *London*, 1906.
- Prinzipien der Generellen Morphologie der Organismen. Pp. xvi, 447, and Portrait. 8vo. *Berlin*, 1906. Author.
- Hagen (Ingebrigt S.). Musci Norvegiæ Borealis. Bericht über die im Nördlichen Norwegen hauptsächlich von den Herren Arnell, Fridtz, Kaalaas, Kaurin, Ryan und dem Herausgeber in den Jahren 1886-1897 gesammelten Laubmoose. Pp. xxiii, 142, Taf. 2. (Tromsø Mus. Aarshefter, xxi.-xxii. n. 3.) 8vo. *Tromsø*, 1904.

- Hall (Alfred Daniel). The Book of the Rothamsted Experiments. Pp. xl, 294, with 2 Portraits. 8vo. London, 1905. **Author.**
- Hamilton (Francis) [*formerly Buchanan*]. See **Prain (David)**. A Sketch of the Life of F. Hamilton (once Buchanan).
- Hansen (Emil Christian). Considerations on Technical Mycology. (Lecture delivered at the Opening of the Department for Technical Mycology at the Heriot Watt College, Edinburgh, Oct. 18th, 1905.) 8vo. London, 1905. **Author.**
- Hartog (Marcus Manuel). The Dual Force of the Dividing Cell. Part I. The Achromatic Spindle Figure illustrated by Magnetic Chains of Force. Pp. 20; plates 3. (Proc. Roy. Soc. B. vol. 76.) 8vo. London, 1905. **Author.**
- Heckel (Édouard). Flore phanérogamique des Antilles Françaises par le R. P. DUSS Avec annotations du E. HECKEL sur l'emploi de ces Plantes. Pp. xxviii, 656. (Ann. Inst. Colonial Marseille, iii.) 8vo. Marseilles, 1897.
- Annales de l'Institut Botanic-Géologique Colonial [afterwards Institut Colonial] de Marseille, publiées sous la direction de E. HECKEL. Vol. I. → See **Marseilles**.
- Heckert (Gustav A.). Leucochloridium Paradoxum. Monographische Darstellung der Entwicklungs- und Lebensgeschichte des *Distomum macrostomum*. Pp. 66; Taf. 4. (Bibl. Zool. Heft 4.) 4to. Cassel, 1889. **N. H. W. Maclaren.**
- Hecksteden (Eduard). Beitrag zur Lehre vom Echinokokkus. Inaugural-Dissertation. Pp. 28; Taf. 1. 8vo. Kiel, 1881. **N. H. W. Maclaren.**
- Henslow (Rev. George). The Uses of British Plants; traced from Antiquity to the Present Day; together with the derivations of their names. Pp. vi, 184, and 288 illustrations. 8vo. London, 1905. **Author.**
- Imitative Forms of *Fusus antiquus* and *Buccinum undatum*, subsequent to Injury. (The Illustrations are mainly from the Collection of the late JOHN GWYN JEFFREYS.) 4to. London [1905]. **Author.**
- Herdman (William Abbott). See **Liverpool: Lancashire Sea-Fisheries Laboratory, &c.**
- See 'Triton,' Cruise of H.M.S. Tunicata.
- Herman (Otto). See **Aquila**.
- Hertwig (Richard). Beiträge zur Kenntniss der Acineten. Inaugural-Dissertation. Pp. 64; Taf. 2. 8vo. Leipzig, 1875. **N. H. W. Maclaren.**
- Hesse (Richard). Ueber das Nervensystem und die Sinnesorgane von *Rhizostoma Cuvieri*. Pp. 46; Taf. 3, figs. 3. (Zeitschr. wiss. Zool. Bd. 60.) 8vo. Leipzig, 1895. **N. H. W. Maclaren.**
- Hickson (Sydney John). See **Maldivé and Laccadive Archipelagoes**. Alcyonaria.
- Hillas (A. B. E.). Record of Salmon Marking Experiments in Ireland, 1902-1905. Pp. 39. (Rept. Fisheries Ireland, Sci. Investig., 1904, vii.) 8vo. Dublin, 1906. **Author.**

- Hise (Charles Richard van). A Treatise on Metamorphism. Pp. 1286; plates 13, figs. 32. (U.S. Geol. Surv. Monogr. 47.) 4to. *Washington*, 1904.
- Hochreutiner (B. P. G.). Catalogus Bogoriensis novus plantarum phanerogamarum quæ in Horto Botanico Bogoriensi coluntur Herbaceis exceptis. Fasc. 1, 2. 8vo. *Buitenzorg*, 1904-1905.
- Hoek (Paulus Peronius Cato). See 'Triton,' Cruise of H.M.S. *Pycnogonida*.
- Holt (Ernest W. L.). Report on the Artificial Propagation of Salmonidæ during the Season of 1904-1905. (Rept. Fisheries Ireland, Sci. Investig., 1904, vii.) 8vo. *Dublin*, 1906. **Author.**
- Holt (Ernest W. L.) and Byrne (L. W.). First Report on the Fishes of the Irish Atlantic Slope. Pp. 28; plate 1. (Rept. Fisheries Ireland, Sci. Investig., 1905, ii.) 8vo. *Dublin*, 1906. **Authors.**
- Holt (Ernest W. L.) and Tattersall (W. M.). Schizopodous Crustacea from the North-East Atlantic Slope. Supplement. Pp. 50; plates 5. (Rept. Fisheries Ireland, Sci. Investig., 1904, v.) 8vo. *Dublin*, 1906. **Authors.**
- Hope Reports. (A Series of Reprints and Extracts from various Journals, reissued for private Circulation.) Edited by EDWARD B. POULTON. Vol. V. 1903-1906. 8vo. *Oxford*, 1906. **E. B. Poulton.**
- Hopkinson (John). See Cash (James). The British Freshwater Rhizopoda and Heliozoa. (Ray Society.)
- Hovey (Edmund Otis). The Grande Soufrière of Guadeloupe. Pp. 18; figs. 9. (Bull. Amer. Geogr. Soc., Sept. 1904.) 8vo. *New York*, 1904. **Author.**
- Howe (Marshall Avery). See Foslie (M.). New American Coral-line Algæ.
- Hoyle (William Evans). See Maldive and Laccadive Archipelagoes. Cephalopoda.
- Imhof (Othmar Emil). Beiträge zur Anatomie der *Perla maxima*, Scopoli. Inaugural-Dissertation. Pp. 41; plates 2. 8vo. *Aarau*, 1881.
- India.
Geological Survey (con.).
 Memoirs (Palæontologia Indica).
 New Series, Vol. II., Memoir No. 2.
 Permian-Carboniferous Plants and Vertebrates from Kashmir. By A. C. SEWARD and A. SMITH WOODWARD. Pp. 14; plates 3. fol. *Calcutta*, 1904.
- Jackson (Benjamin Daydon). A Glossary of Botanic Terms with their Derivation and Accent. Second Edition, Revised and Enlarged. Pp. xi, 370. 8vo. *London*, 1905. **Author.**
- See Durand (Théophile). Index Kewensis.
- See English Men of Science—Bentham (George).
- LINN. SOC. PROCEEDINGS.—SESSION 1905-1906. *h*

- Jägerskiöld (L. A.).** Ueber den Bau des *Ogmogaster plicatus* [Creplin], (*Monostomum plicatum*, Creplin). Pp. 32; plates 2. (Kongl. Sv. Vet.-Akad. Handl. xxiv. n. 7.) 4to. *Stockholm*, 1891.
- Ueber *Monostomum lacteum*, n. sp. Pp. 11; pl. 1. (Zool. Studien. Festschr. W. Lilljeborg, pp. 167-177, Taf. 9.) 4to. *Upsala*, 1896. **N. H. W. Maclaren.**
- Jäggli (Mario).** Notizie sulla Florula del Colle di Sasso Corbario. Presso Bellinzona. Pp. 7. (Boll. Soc. ticinese Sci. Nat., Anno ii.) 8vo. *Locarno*, 1905. **Author.**
- Jensen (Adolf Severin).** On the Mollusca of East Greenland.— I. Lamellibranchiata. With an Introduction on Greenland's Fossil Mollusc-Fauna from the Quaternary Time. Pp. 74. (Meddel. Grönland, xxix.) 8vo. *Copenhagen*, 1905. **Author.**
- Johnstone (James).** See **Liverpool:** Lancashire Sea-Fisheries Laboratory, &c.
- Journal of Botany.** Vol. 44. 8vo. *London*, 1906. **Jas. Britten.**
- Journal (The) of Economic Biology.** Edited by WALTER EDWARD COLLINGE. Vol. I. nos. 1-3. 8vo. *London*, 1905-1906.
- Journal (The) of Tropical Veterinary Science.** (Issued Quarterly.) Editors: H. T. PEASE, F. S. H. BALDREY, R. E. MONTGOMERY. Vol. I. no. 1. 8vo. *Calcutta*, 1906.
- Juel (H. O.).** Beiträge zur Anatomie der Trematodengattung *Apolema* (Dujard.). Pp. 46, Taf. 1. (Bih. K. Sv. Vet.-Akad. Handl. xv. Afd. iv. no. 6.) 8vo. *Stockholm*, 1889. **N. H. W. Maclaren.**
- Kampen (P. N. van).** Die Tympanalgegend des Säugetierschädels. Pp. 400; figs. 96. (Gegenb. Morphol. Jahrb. Bd. 34.) 8vo. *Leipzig*, 1905.
- Kew.**
Royal Botanic Gardens.
 Bulletin of Miscellaneous Information.
 Nos. 157-158 for (1900). }
 No. 2 for 1905. } 8vo. *London*, 1906.
 Appendix II. }
 Additional Series V. 1906. 8vo. *London*, 1900-1906.
 V. The Wild Fauna and Flora of the Royal Botanic Gardens, Kew. 1906.
- Catalogue of Portraits of Botanists exhibited in the Museums of the Royal Botanic Gardens. By JAMES D. MILNER. Pp. v, 105. 8vo. *London*, 1906. **Director.**
- Kirchner (Oskar), Loew (Ernst), und Schröter (Carl).** Lebensgeschichte der Blütenpflanzen Mitteleuropas. Spezielle Ökologie der Blütenpflanzen Deutschlands, Österreichs und der Schweiz. Band I. Liefg. 1-4. 4to. *Stuttgart*, 1904-1906.
- Knischewsky (Olga).** Beitrag zur Morphologie von *Thunja occidentalis*. Inaugural-Dissertation. Pp. 36, Tafeln 3. 8vo. *Bonn*, 1905. **Dr. H. Schinz.**

- Knuth (R.)** *See Engler (A.)*. Das Pflanzenreich. Heft 22. Primulaceæ.
- Kölliker (Rudolph Albert von)**. Erinnerungen aus meinem Leben. Pp. x, 399; mit 7 Vollbildern, 10 Textfiguren und Porträt. 8vo. *Leipzig*, 1899.
- Die Entwicklung der Elemente des Nervensystems. Pp. 38; mit 4 Tafeln und 12 Figuren im Text. (Zeitschr. für wiss. Zool. Bd. 82.) 8vo. *Leipzig*, 1905. **Author**.
- Kostlivý (Stanislav)**. Untersuchungen über die Klimatischen Verhältnisse von Beirut, Syrien. Pp. 159. 8vo. *Prag*, 1905.
- Krabbe (Harald)**. Bidrag til Kundskab om Fuglenes Bændelorme. Pp. 118; plates 10. (Danske Selsk. Skr., 5 Række, Afd. i. n. 7.) 4to. *Kjöbenhavn*, 1869.
- Nye Bidrag til Kundskab om Fuglenes Bændelorme. Pp. 18, tab. 2. (Danske Selsk. Skr., 6 Række, Afd. i. n. 7.) 8vo. *Kjöbenhavn*, 1882. **N. H. W. Maclaren**.
- Küchenmeister (Friedrich)**. Die Finne des *Bothriocephalus* und ihre Uebertragung auf den Menschen. Pp. 44. 8vo. *Leipzig*, 1886. **N. H. W. Maclaren**.
- Kupelwieser (Hans)**. Untersuchungen über den feineren Bau und die Metamorphose des *Cyphonautes*. Pp. 50; plates 5. (Zoologica, Bd. xix. Heft 47.) 4to. *Stuttgart*, 1906.
- Lafar (Franz)**. Technische Mykologie, III. 8vo. *Jena*, 1906.
- Laidlaw (Frank Fortescue)**. *See Maldive and Laccadive Archipelagoes*. Amphibia and Reptilia.
- — Dragon-Flies.
- — Land Planarian.
- — Marine Turbellaria.
- Lake (Hilda)**. *See Drabble (Eric)*. On the Effect of Carbon Dioxide on Geotropic Curvature of the Roots of *Pisum sativum*, L.
- *See Drabble (Eric)*. The Osmotic Strength of Cell-Sap in Plants growing under different Conditions.
- Lanchester (W. F.)**. *See Maldive and Laccadive Archipelagoes*. Marine Crustaceans: Stomatopoda.
- Lebrun (Hector)**. Application de la méthode des disques rotatifs à la technique microscopique. Pp. 29; figs. 36. (Zeitschr. wiss. Mikrosk. xxiii.) 8vo. *Braunschweig*, 1906. **Author**.
- Leicester**.
Leicester Corporation Museum and Art Gallery.
 Reports 14, 15. 8vo. *Leicester*, 1904–1905.
- Leuckart (Rudolf)**. Untersuchungen über *Trichina spiralis*. Zugleich ein Beitrag zur Kenntniss der Wurmkrankheiten. Pp. 57; Tab. 2. 4to. *Leipzig & Heidelberg*, 1860.
- Ueber den Larvenzustand und die Metamorphose der Echinorhynchen. Pp. 37. 4to. *Leipzig*, 1873.

Leuckart (Rudolf). *Archigetes Sieboldi*, eine geschlechtsreife Cestodenlarve. Mit Bemerkungen über die Entwicklungsgeschichte der Bandwürmer. Pp. 14. (Zeitschr. f. wiss. Zool. xxx. Suppl.) 8vo. *Leipzig*, 1878. **N. H. W. MacLaren.**

Lewis (Francis John). The History of the Scottish Peat-Mosses and their Relation to the Glacial Period. Pp. 12; figs. 3. (Scottish Geogr. Mag., May 1906.) 8vo. *Edinburgh*, 1906.

Author.

Linton (Edwin). Notes on Cestode Parasites of Fishes. Pp. 34; plates 8. (Proc. U.S. Nat. Mus. xx.) 8vo. *Washington*, 1898.

— Notes on Trematode Parasites of Fishes. Pp. 42; plates 15. (Proc. U.S. Nat. Mus. xx.)

8vo. *Washington*, 1898.

— Parasites of Fishes of Beaufort, North Carolina. Pp. 108; plates 34. (Bull. Bureau of Fisheries for 1904, vol. 24, pp. 321-428, plates 1-34.)

8vo. *Washington*, 1905.

N. H. W. MacLaren.

Liverpool.

Institute of Commercial Research in the Tropics, Liverpool University.

Quarterly Journal. Vol. I. no. 1. 8vo. *Liverpool*, 1906.

Lancashire Sea-Fisheries Laboratory at the University of Liverpool and the Sea-Fish Hatchery at Piel.

No. XIV. Report for 1905.

(Drawn up by Prof. W. A. HERDMAN, assisted by ANDREW SCOTT and JAMES JOHNSTONE.)

8vo. *Liverpool*, 1906. **Prof. W. A. Herdman.**

Marine Biological Station at Port Erin (Isle of Man).

Annual Report 19.

8vo. *Liverpool*, 1905.

Prof. W. A. Herdman.

University of Liverpool.

History of the Department of Zoology New Museum and Laboratories to be opened by The Right Hon. The Earl of Onslow, on November 18, 1905. Pp. 17; 1 plate and 6 Plans. 8vo. *Liverpool*, 1905. **Prof. W. A. Herdman.**

Loew (Ernst). See **Kirchner (Oskar).** Lebensgeschichte der Blütenpflanzen Mitteleuropas.

Lohaus (Karl). Der anatomische Bau der Laubblätter der Festucaceen und dessen Bedeutung für die Systematik. Pp. vi, 114; mit 16 Tafeln. (Bibl. Bot. Heft 63.)

4to. *Stuttgart*, 1905.

London.

Rothamsted Experimental Station, Harpenden.

Guide to the Experimental Plots, 1906.

8vo. *London*, 1906. **A. D. Hall.**

South London Entomological and Natural History Society.

Proceedings for 1904-1905.

8vo. *London*, 1905.

Secretaries.

- Looss (Arthur).** Zur Frage nach der Natur des Körperparenchyms bei den Trematoden, nebst Bemerkungen über einige andere, zur Zeit noch offene Fragen. Pp. 25. (Ber. Sächsisch. Ges. vii.) 8vo. *Leipzig*, 1892.
- Ueber den Bau von *Distomum heterophyes* v. Sieb. und *Distomum fraternum*, n. sp. Pp. 59; Tab. 2. 8vo. *Kassel*, 1894. **N. H. W. MacLaren.**
- Lortet (Louis) et Vialleton (Louis).** Étude sur le *Bilharzia hæmatobia* et la Bilharziose. Pp. 118; pls. 8, figs. 8. (Ann. Univ. Lyon, ix.) 8vo. *Paris*, 1894. **N. H. W. MacLaren.**
- Lubbock (Sir John) [Lord Avebury].** Notes on the Life-History of British Flowering Plants. Pp. xxiii, 450; figs. 352. 8vo. *London*, 1905. **Author.**
- Maas (Otto).** Die Craspedoten Medusen der Siboga-Expedition. See *Siboga-Expeditie*. Monogr. X.
- McAlpine (Daniel).** The Rusts of Australia, their Structure, Nature, and Classification. Pp. vi, 349; with 55 plates (including 366 Figures). 8vo. *Melbourne*, 1906. **Secretary of Agric.**
- McCabe (Joseph).** See **Haeckel (Ernst Heinrich).** Last Words on Evolution.
- McGregor (Richard C.) and Worcester (Dean C.).** A Hand-List of the Birds of the Philippine Islands. (Dept. of the Interior. Bureau of Govt. Laborat., no. 36.) 8vo. *Manila*, 1906.
- MacMunn (C. A.).** See **Maldive and Laccadive Archipelagoes.** Pigments of certain Corals, and Asteroid.
- Magdeburg.**
Museum für Natur- und Heimatkunde.
 Abhandlungen und Berichte. Band I. Heft 1. 8vo. *Magdeburg*, 1905→
- Maldive and Laccadive Archipelagoes.** The Fauna and Geography of: being the Account of the Work carried on and of the Collections made by an Expedition during the years 1899 and 1900. Edited by **JOHN STANLEY GARDINER.** Vols. I.-II. Supplement I. 4to. *Cambridge*, 1901-1905.

Vol. I.

- Introduction. By **J. STANLEY GARDINER.** 1901.
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 Marine Turbellaria. By FRANK FORTESCUE LAIDLAW. 1902.
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 COOPER. 1903.
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 stomata. VII. The Barnacles. By L. A. BORRADAILE. 1903.
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 Varieties of *Gonodactylus chiragra*. By W. F. LANCHESTER. 1903.
 Lithothamnina. By M. FOSLIE. 1903.

Vol. II.

- Alcyonaria. Part I. By Prof. SYDNEY J. HICKSON. 1903.
 Alcyonaria. Part II. By EDITH M. PRATT. 1903.
 Nudibranchiata. By Sir CHARLES ELIOT. 1903.
 Marine Crustaceans. IX. The Sponge-crabs (Dromiacea). By L. A.
 BORRADAILE. 1903.
 Land Planarian. By F. F. LAIDLAW. 1903.
 Lagoon Deposits.
 I. General Account. By J. STANLEY GARDINER. 1903.
 II. Report on certain Deposits. By Sir JOHN MURRAY. 1903.
 Marine Mollusca. By EDGAR A. SMITH. 1903.
 Enteropneusta. By R. C. PUNNETT. 1903.
 Marine Crustaceans. X. The Spider-Crabs (Oxyrhyncha). XI. On the
 Classification and Genealogy of the Reptant Decapods. By
 L. A. BORRADAILE. 1903.
 Marine Crustaceans. XII. Isopoda, with Description of a new Genus.
 By Rev. T. R. R. STEBBING. 1904.
 Hydromedusæ, with a Revision of the Willadiæ and Petasidæ. By
 EDWARD T. BROWNE. 1904.
 Marine Crustaceans. XIII. The Hippidea, Thalassinidea, and
 Scyllaridea. By L. A. BORRADAILE. 1904.
 Madreporaria. By J. STANLEY GARDINER. 1904.
 Antipatharia. By C. FORSTER-COOPER. 1904.
 Arachnida. By R. I. POCKOCK. 1904.
 Alcyonaria. By SYDNEY J. HICKSON. 1905.
 Marine Crustaceans. XIV. Paguridæ. By Major ALCOCK. 1905.
 Hydroids. By L. A. BORRADAILE. 1905.
 Notes on Parasites. By A. E. SHIPLEY. 1905.
 Rhynchota. By W. L. DISTANT. 1905.
 Marine Crustaceans. XV. Les Alpheidæ. By Prof. H. COUTIERE.
 1905.

Vol. II.—Supplement I.

- Marine Crustaceans. XVI. Amphipoda. By A. O. WALKER. 1905.
 Madreporaria. III. Fungida. IV. Turbinolidæ. By J. STANLEY
 GARDINER. 1905.
 Scyphomedusæ. By EDWARD T. BROWNE. 1905.
 Coleoptera. By D. SHARP. 1905.
 Cephalopoda. By W. E. HOYLE. 1905.
 Copepoda. By R. NORRIS WOLFENDEN. 1905.

Manchester.

Botanical Exchange Club of the British Isles.

Report for 1905. 8vo. *Oxford*, 1906. J. Walter White.

Manila.

Department of the Interior.

Bureau of Government Laboratories. No. 36.

8vo. *Manila*, 1906.

No. 36. MCGREGOR (RICHARD C.) and WORCESTER (DEAN C.). A Hand-List of the Birds of the Philippine Islands. Pp. 123. 1906.

Marquand (Ernest David). The Guernsey Dialect and its Plant Names. Pp. 17. (Trans. Guernsey Soc. Nat. Sci. 1905.)

8vo. *Guernsey*, 1905. Author.

Marshall (Arthur Milnes). See 'Triton,' Cruise of H.M.S. Pennatulida.

Marshall (John James). A List of the Mosses and Hepatics of the Riding. See Robinson (James Fraser). Flora of the East Riding of Yorkshire. Pp. 226.

Martius (Karl Friedrich Philipp von). Zur Erinnerung an K. F. PH. v. MARTIUS. Gedächtnisrede bei Enthüllung seiner Büste im K. Botanischen Garten in München am 9. Juni, 1905, von K. GOEBEL. Pp. 20. 4to. *München*, 1905.

Massee (George). British Fungi. Phycomycetes and Ustilagineæ. Pp. xv, 232; plates 8. 8vo. *London*, 1891.

Meigen (Wilhelm). See Eichler (Julius). Ergebnisse der pflanzengeographischen Durchforschung von Württemberg, Baden und Hohenzollern. I.

Melbourne.

Department of Agriculture.

Year Book for 1905.

8vo. *Melbourne*, 1905.

National Museum.

Memoirs. No. 1.

4to. *Melbourne*, 1906.

I. WOODWARD (ARTHUR SMITH). On a Carboniferous Fish Fauna from the Mansfield District, Victoria. Pp. 32, plates 11. 1906.

Menzier (Michael Alex). *Tetrastes griseiventris*, new species. Pp. 9, plate 1 col. (Proc. Imper. Moscow Univ., i.) (*in Russian*). 8vo. *Moscow*, 1880.

Meyrick (Edward). See Maldive and Laccadive Archipelagoes. Lepidoptera.

Milner (James D.). Catalogue of Portraits of Botanists exhibited in the Museums of the Royal Botanic Gardens, Kew. Pp. v, 105. 8vo. *London*, 1906.

Möbius (Karl August). Können die Tiere Schönheit wahrnehmen und empfinden? Pp. 9. (S.B. K. Preuss. Akad. Wiss. No. 10.) 8vo. *Berlin*, 1906. Author.

Möbius (Martin). DE TONI, G. B. Sylloge Algarum omnium hucusque cognitarum. Vols. I.-IV. Patavii, 1889-1905. Notice of. Pp. 3. (Naturwissenschaftliche Wochenschrift, xx.) 4to. *Jena*, 1905. G. B. De Toni.

- Moeller (Josef).** Mikroskopie der Nahrungs- und Genussmittel aus dem Pflanzenreiche. Zweite, gänzlich umgearbeitete und unter Mitwirkung A. L. WINTON's vermehrte Auflage. Pp. xvi, 599; mit 599 Figuren. 8vo. *Berlin*, 1905.
- Monckton (Horace Woollaston).** The Natural History of Berkshire. Geology. Pp. 24. (Victoria History of the County.) fol. *London*, 1906. **Author.**
- Monnier (Alfred).** Les Matières minérales et la loi d'accroissement des végétaux. Pp. 33; plates 9. (Univ. Genève Inst. Bot. ser. 7, fasc. 3.) 8vo. *Genève*, 1905. **R. Chodat.**
- Montgomery (R. E.).** See *Journal of Tropical Veterinary Science.*
- Monticelli (Francesco Saverio).** Saggio di una Morfologia dei Trematodi. Pp. 130. 4to. *Napoli*, 1888.
- Studii sui Trematodi endoparassiti. Pp. 229, tav. 8, 3 figs. in text. (Zool. Jahrb. Jena, Suppl. iii.) 8vo. *Jena*, 1893. **N. H. W. MacLaren.**
- Müller (Karl)** in Freiburg i./Br. Monographie der Lebermoosgattung *Scapania* Dum. Pp. 312, Taf. 52. (Nova Acta, Bd. 83.) 4to. *Halle a./S.*, 1905.
- Munich.**
Königlich-bayerische Akademie der Wissenschaften.
 Gedächtnisrede auf KARL ALFRED VON ZITTEL gehalten in der öffentlichen Sitzung der K.B. Akademie der Wissenschaften zu München zur Feier ihres 146. Stiftungstages am 15. März 1905, von AUGUST ROTHPLETZ. Pp. 23. 4to. *München*, 1905.
 Zur Erinnerung an K. F. PH. v. MARTIUS. Gedächtnisrede bei Enthüllung seiner Buste im K. Botanischen Garten in München am 9. Juni, 1905, von K. GOEBEL. Pp. 20. 4to. *München*, 1905.
- Murray (Sir John).** See *Maldivé and Laccadive Archipelagoes. Report on certain Deposits.*
- Naegeli (Otto) and Thellung (A.).** Die Flora des Kantons Zürich. Teil I. Die Ruderal- und Adventivflora des Kantons Zürich. Pp. 82. (Vierteljahrsschr. Nat. Ges. Zürich, Jahrg. 50.) 8vo. *Zürich*, 1905. **Dr. Hans Schinz.**
- Naples.**
Zoologische Station zu Neapel.
 Fauna und Flora des Golfes von Neapel. Monographie XXVIII. 4to. *Berlin*, 1906.
 XXVIII. *Ichthyotomus sanguinarius.* Eine auf Aalen schmarotzende Annelide. Von Hugo EISEN. Pp. xi, 300; mit 10 Taf. und 34 Textfig. 1906.
- Nash (C. W.).** Check List of the Vertebrates of Ontario and Catalogue of Specimens in the Biological Section of the Provincial Museum. Birds. Pp. 82, figs. 21. 8vo. *Toronto*, 1905. **Author.**
- Natal, Department of Agriculture.** See *Pietermaritzburg.*

- Němec (Bohumil).** Studien über die Regeneration. Pp. 387. mit 180 Abbildungen im Text. 8vo. *Berlin*, 1905.
- Nicoloff (Th.).** Sur le type floral et le développement du fruit des Juglandées. Pp. 46, figs. 35, plates 2. (*Journ. de Bot.* xxviii., xxix.) 8vo. *Paris*, 1904–1905. **R. Chodat.**
- Niemiec (J.).** Recherches morphologiques sur les Ventouses dans le Règne Animal. Pp. 147, plates 5. (*Rec. Zool. Suisse*, ii.) 8vo. *Genève*, 1885. **N. H. W. MacLaren.**
- Nordstedt (Carl Frederik Otto).** Algological Notes, 1–4. Pp. 28. (*Bot. Notiser*, 1906.) 8vo. *Lund*, 1906. **Author.**
- Norman (Alfred Merle).** Museum Normanianum, or a Catalogue of the Invertebrata of Europe, and the Arctic and North Atlantic Oceans, which are contained in the Collection of the Rev. Canon A. M. NORMAN. Parts 1–12. 8vo. *Houghton-le-Spring and Durham*, 1886–1905.
- Notes on the Natural History of East Finmark. (*Ann. Mag. Nat. Hist.* ser. 7, vols. x., xi., xii., xv.) 8vo. *London*, 1902–1905. **Author.**
- Norman (Alfred Merle) and Scott (Thomas).** The Crustacea of Devon and Cornwall. Pp. xv, 232; plates 24. 8vo. *London*, 1906. **Canon A. M. Norman.**
- Normentafeln zur Entwicklungsgeschichte der Wirbelthiere.** Herausgegeben von Dr. FRANZ KEIBEL. Heft 6. fol. *Jena*, 1906.
- VI. SAKURAI (TSUNEJIRO). Normentafel zur Entwicklungsgeschichte des Rehes (*Cervus Capreolus*). Mit einem Vorwort von Dr. F. KEIBEL. Pp. 100, Taf. 3. 1906.
- Oliver (Daniel).** Flora of Tropical Africa. Vols. I.–III. 8vo. *London*, 1868–77.
- [Continued as]
- Flora of Tropical Africa. By various Botanists. Edited by Sir WILLIAM TURNER THISELTON-DYER. Vol. IV. sect. 2, Parts 1, 2, 3. 8vo. *London*, 1905–1906. **Sir W. T. Thiselton-Dyer.**
- Olsson (Peter).** Entozoa, iakttagna hos Skandinaviska hafsfiskar. Pp. 64, tab. 3. (*Lunds Univ. Årsskrift*, iv.) 4to. *Lund*, 1867.
- Bidrag till Skandinaviens Helminthfauna. I., II. Pp. 35, Taf. 4. (*Kgl. Sv. Vet.-Akad. Handl.* xiv. no. 1; xxv. no. 12.) 4to. *Stockholm*, 1876–1893.
- Entozoa, iakttagna hos Skandinaviska hafsfiskar. Platyelminthes. I. Akademisk Afhandling. Pp. 39, tab. 2. (*Lunds Univ. Årsskrift*, iii.) 4to. *Lund*, 1867. **N. H. W. MacLaren.**
- Oltmanns (Friedrich).** Morphologie und Biologie der Algen. Bände 2. 8vo. *Jena*, 1904–1905.
- Band I. Spezieller Teil. Pp. vi, 733; mit 476 Abbildungen. 1904.
- „ II. Allgemeiner Teil. Pp. vi, 443; mit 150 Abbildungen und 3 Tafeln. 1905.

- Oxford. *See* Manchester. Botanical Exchange Club of the British Isles.
- Parker (William Newton). *See* Weismann (August). The Germ-Plasm.
- Parona (Corrado). Appunti storici di Elmintologia Italiana a Contributo della corologia Elmintologica umana in Italia. Pp. 21. (Gazzetta Medica Italiano-Lombardia, Anno 1888.) 8vo. Milano, 1888.
- Sedi insolite del "*Cœnurus serialis*," Gerv. nel coniglio e nella lepre. Pp. 8, fig. 1. (Ann. R. Accad. Agric. Torino, vol. 46.) 8vo. Torino, 1903. N. H. W. Maclaren.
- Pax (Ferdinand). *See* Engler (A.). Das Pflanzenreich. Heft 22. Primulaceæ.
- Pease (H. T.). *See* Journal of Tropical Veterinary Science
- Pérádeniya.
- Royal Botanic Gardens.
- Annals. Vols. I-III. Part 1. 8vo. Colombo, 1901-1906.
- Circulars and Agricultural Journal. Vol. III. nos. 14, 15. 8vo. Colombo, 1906. J. C. Willis.
- Pettit (Auguste). Description des encéphales de *Grampus griseus* Cuv., de *Steno frontatus* Cuv., et de *Globicephalus melas* Traill, provenant des Campagnes du Yacht *Princesse-Alice*. *See* Albert.
- Pfeffer (Wilhelm). The Physiology of Plants: A Treatise upon the Metabolism and Sources of Energy in Plants. Second fully revised Edition. Translated and Edited by ALFRED J. EWART. 3 vols. 8vo. Oxford, 1900-1906.
- Pflanzenreich (Das). *See* Engler (Adolf).
- Pietermaritzburg.
- Natal Department of Agriculture.
- Bulletin 7. 8vo. Pietermaritzburg, 1905.
- No. 7. Tree-Planting in Natal. By T. R. SIM. Pp. 354, Index pp. xviii; figs. 99. 1905.
- Natal Government Museum.
- Annals. Vol. I. Part 1. 8vo. London, 1906.
- Report, 1. fol. Pietermaritzburg, 1906.
- Piper (Charles V.). North American Species of *Festuca*. Pp. 48; plates 15. (Contr. U.S. Nat. Herb. x. pt. 1.) 8vo. Washington, 1906.
- Plankton-Expedition der Humboldt-Stiftung (con.).
- Band I.-> 4to. Kiel & Leipzig, 1892-1906.
- Bd. II. F. b. Die Pteropoden, von P. SCHIEMENZ. 1903.
- „ II. G. g. Die Ostracoden (Halocypriden und Cypridiniden) . . . von W. VÁYRA. 1906.
- „ III. h. 3. Die Trippleen Radiolarien: Atlanticeididae von A. BORGERT. 1906.
- Pocock (Reginald Innes). *See* Maldive and Laccadive Archipelagoes. Arachnida.

- Prain (David).** A Sketch of the Life of FRANCIS HAMILTON (once BUCHANAN), sometime Superintendent of the Honourable Company's Botanic Garden, Calcutta. Pp. lxxv. (Ann. Roy. Bot. Garden, Calcutta, vol. x. pt. 2.) 4to. Calcutta, 1905.
Author.
- Pratt (Edith M.).** See Maldivé and Laccadive Archipelagoes. Alcyonaria, Part II.
- Punnett (R. C.).** See Maldivé and Laccadive Archipelagoes. Cephalochorda. Meristic Variation in the Group.
- Enteropneusta.
- Nemerteans.
- Rádl (Emil).** Geschichte der Biologischen Theorien seit dem Ende des Siebzehnten Jahrhunderts. Teil I. Pp. vii, 320. 8vo. Leipzig, 1905.
- Ray Society.** Publications (cont.).
- WEST (WILLIAM) and WEST (GEORGE STEPHEN). A Monograph of the British Desmidiaceæ. Vol. II. Pp. x, 204; plates 33-64. 8vo. London, 1905.
- Regan (C. Tate).** See Maldivé and Laccadive Archipelagoes. Fishes.
- Reid (Clement).** Plant-Remains of Roman Silchester. Pp. 2. (Archæologia, Soc. Antiqu. vol. 59, part 2, pp. 369-370.) 4to. London, 1905.
Author.
- Retzius (Gustaf).** Biologische Untersuchungen. Neue Folge. XIII. fol. Stockholm, 1906. Author.
- Rhodesia Scientific Association.** See Bulawayo.
- Richardson (Harriet).** A Monograph on the Isopods of North America. Pp. liii, 727; figs. 740. (Bull. U.S. Nat. Mus. no. 54.) 8vo. Washington, 1905.
- Riffarth (Heinrich).** See Berlin — Das Tierreich, Liefg. 22. Lepidoptera: Heliconiidae.
- Río (Manuel E.) und Achával (Luis).** Geografía de la Provincia de Córdoba. Text 2 vols. Roy. 8vo. Buenos Aires, 1904-1905. Atlas. fol. „ „ 1905.
- Vol. I. pp. xxix, 569.
- „ II. pp. vi, 669. Atlas, maps 9, plates 6.
- Robinson (Charles Budd).** The Chæreæ of North America. Pp. 65. (Bull. New York Bot. Gard. vol. iv. no. 13.) 8vo. New York, 1906. B. Daydon Jackson.
- Robinson (James Fraser).** The Flora of the East Riding of Yorkshire, including a physiographical sketch. To which is added a List of the Mosses and Hepatics of the Riding. Pp. 253 and Map. 8vo. London, 1902.
- Robinson (William).** See Flora and Silva. Edited by W. ROBINSON.
- Rodway (Leonard).** The Tasmanian Flora. Pp. xix, 320; plates 50. 8vo. Hobart, 1903.
- Rönnefeldt (Harriett).** See Weismann (August). The Germ-Plasm.

- Rothpletz (August).** Gedächtnisrede auf **KARL ALFRED VON ZITTEL** gehalten in der öffentlichen Sitzung der K.B. Akademie der Wissenschaften zu München zur Feier ihres 146. Stiftungstages am 15. März 1905. Pp. 23. 4to. *München*, 1905.
- Roux (Wilhelm).** Vorträge und Aufsätze über Entwicklungsmechanik der Organismen. Herausgegeben von **W. ROUX**. Heft 1→ 8vo. *Leipzig*, 1905→
- Sablon (Leclerc du).** See **Bonnier (Gaston)**. Cours de Botanique.
- Saccardo (Pietro Andrea).** Sylloge Fungorum omnium hucusque cognitorum. Vol. XVIII. Supplementum Universale. Pars VII. Discomycetæ—Deuteromycetæ. Auctoribus **P. A. SACCARDO** et **D. SACCARDO** Fil. Pp. vii, 838. 8vo. *Patavii*, 1906.
- Sadebeck (Richard).** Die Kulturgewächse der deutschen Kolonien und ihre Erzeugnisse. Pp. xiii, 366, mit 127 Abbildungen. 8vo. *Jena*, 1899.
- Saeffigen (Armand).** Zur Organisation der Echinorhynchen. Inaugural-Dissertation. Pp. 52, Taf. 3. (Morphol. Jahrb. x.) 8vo. *Leipzig*, 1884. **N. H. W. Maclaren**.
- St. Petersburg.**
Musée Botanique de l'Académie Impériale des Sciences.
 Proceedings. Part 2. 8vo. *St. Petersburg*, 1905.
 — Schedæ ad Herbarium Floræ Rossicæ. V. (Nos. 1201–1600.) 8vo. *St. Petersburg*, 1905.
- Sakurai (Tsunejiro).** Normentafel zur Entwicklungsgeschichte des Rehes (*Cervus Capreolus*). Mit einem Vorwort von Dr. F. KEIBEL. Pp. 100, Taf. 3. See **Normentafeln zur Entwicklungsgeschichte der Wirbelthiere**. Heft 6.
- Salmon (Ernest Stanley).** The present danger threatening Gooseberry Growers in England. Pp. 4. (Gard. Chron. 3 ser. xxxviii.) 4to. *London*, 1905. **Author**.
- Sargent (Charles Sprague).** Trees and Shrubs: illustrations of new or little-known Ligneous Plants prepared chiefly from Material at the Arnold Arboretum of Harvard University. Vol. I. 4to. *Boston & New York*, 1902–1905. **Frank Crisp**.
- Schauinsland (Hugo).** Beitrag zur Kenntniss der Embryonalentwicklung der Trematoden. Pp. 63, Taf. 3. (Zeitschr. f. Naturwiss. xvi.) 8vo. *Jena*, 1883. **N. H. W. Maclaren**.
- Schellens (W.).** Ueber das Verhalten von pflanzlichen und tierischen Textilstoffen zu Metallsalzlösungen. Pp. 11. (Arch. der Pharmazie, Band 243, Heft 8.) 8vo. *Berlin*, 1905. **Dr. Ed. Schaer**.
- Schenck (Otto).** Die antennalen Hautsinnesorgane einiger Lepidopteren und Hymenopteren mit besonderer Berücksichtigung der sexuellen Unterschiede. Inaugural-Dissertation. Pp. 47, Taf. 2. 4to. *Jena*, 1902. **N. H. W. Maclaren**.
- Scherren (Henry).** On old Pictures of the Zebra. Pp. 3. (Proc. Zool. Soc. Lond. 1905, vol. i.) 8vo. *London*, 1905. **Author**.
- Schiemenz (Paul).** See **Plankton-Expedition**. Pteropoden.

- Schinz (Hans). *Plantæ Menyharthianæ*; ein Beitrag zur Kenntnis der Flora des Unteren Sambesi. Pp. 79. (Denkschr. math.-nat. Klasse K. Akad. Wiss. Wien, Bd. 78, pp. 367-445.)
4to. *Wien*, 1905.
- Beiträge zur Kenntnis der afrikanischen Flora. XVIII. (Vierteljahrsschr. Naturf. Ges. Zürich, Jahrg. 51, Heft 1.)
8vo. *Zürich*, 1906.
- Die Myxomyceten oder Schleimpilze der Schweiz. Pp. 129, figs. 45. (Mitt. Naturw. Ges. Winterthur, Heft 6.)
8vo. *Winterthur*, 1906. Author.
- Schlich (William). *Manual of Forestry*. Third Edition. Vol. I.
8vo. *London*, 1906. India Office.
- Schneider (Camillo Karl). *Illustriertes Handwörterbuch der Botanik*. Pp. viii, 690; mit 341 Abbildungen im Text.
8vo. *Leipzig*, 1905.
- Schroeder (August). Beiträge zur Kenntnis einiger ausländischen Fette und Ole. Inaugural-Dissertation. Pp. 67.
8vo. *Strassburg i./Elsass*, 1905. Dr. Ed. Schaer.
- Schröter (Carl). See *Kirchner* (Oskar). *Lebensgeschichte der Blütenpflanzen Mitteleuropas*.
- Schumann (Karl) und Lauterbach (Karl). Nachträge zur Flora der Deutschen Schutzgebiete in der Südsee. (Mit Ausschluss Samoa's und der Karolinen.) Pp. 446; mit 14 Tafeln und Bildnis von K. SCHUMANN.
Royal 8vo. *Leipzig*, 1905.
- Scott (Andrew). See *Liverpool: Lancashire Sea-Fisheries Laboratory, &c.*
- Sellerbeck (Heinrich). *De Trichinosis*. Dissertatio Inauguralis. Pp. 30.
8vo. *Berlin*, 1866. N. H. W. Maclaren.
- Seward (Albert Charles) and Woodward (Arthur Smith). *Permo-Carboniferous Plants and Vertebrates from Kashmir*. Pp. 14, plates 3. (Mem. Geol. Surv., Palæont. Ind., New Series, vol. ii. Mem. no. 2.)
fol. *Calcutta*, 1904.
- Sharp (David). See *Maldivé and Laccadive Archipelagoes*. *Coleoptera*.
- Sherborn (Charles Davies) and Woodward (Bernard Barham). On the Dates of Publication of the Natural History Portions of the "Encyclopédie Méthodique." Pp. 6. (Ann. Mag. Nat. Hist. ser. 7, xvii.)
8vo. *London*, 1906. Author.
- Shipley (Arthur E.). See *Maldivé and Laccadive Archipelagoes*. *Echiuroidea*.
- ——— Parasites.
- ——— Sipunculoidea.
- Siboga-Expeditie. Livr. 16-29.
4to. *Leiden*, 1904-06.
Dr. Max Weber.
- Silva. See *Flora and Silva*. Edited by W. ROBINSON.
- Silvestri (Filippo). Contribuzioni alla conoscenza biologica degli Imenotteri Parassiti, I. Pp. 51; tav. 5, figs. 13. (Ann. R. Scuola Sup. Agricolt. Portici, vi.)
8vo. *Portici*, 1906.
Author.

- Sim (Thomas R.).** Tree Planting in Natal. Pp. 354, Index pp. xviii; figs. 99. (Bull. No. 7, Dept. Agric. Natal.)
8vo. *Pietermaritzburg*, 1905. **Author.**
- Simmons (Herman George).** Ytterligare om Färöarnes hafsalg-vegetation och om hafsalgernas spridning. Pp. 16. (Bot. Notiser, 1905, pp. 193-208.) 8vo. *Lund*, 1905. **Author.**
- Sinclair (S.).** See **Sydney, Australian Museum.** Catalogue of the Library of the Austral. Mus.
- Sladen (Walter Percy).** See 'Triton,' Cruise of H.M.S. *Asteroides*.
- Sluiter (C. Ph.).** Die Tunicaten der Siboga-Expedition, Supplement zu der I. Abteilung: Die Socialen und Holosomen Ascidien. See **Siboga-Expedition**, livr. 24.
- Smith (Edgar Albert).** See **Maldiva and Laccadive Archipelagoes.** Land and Freshwater Mollusca.
—— Marine Mollusca.
- Smith (Johannes Jacobus).** Die Orchideen von Ambon. Pp. 125. (Herausgegeben vom Depart. Landwirtschaft.)
8vo. *Batavia*, 1905.
- Smith (John Donnell).** Enumeratio Plantarum Guatemalensium necnon Salvadorensium, Hondurensium, Nicaraguensium, Costaricensium. Pars VII. Pp. 73. 8vo. *Oquawka*, 1905.
Author.
- Sommer (Ferdinand).** Die Anatomie des Leberegels, *Distomum hepaticum*, L. Pp. 104, Taf. 6. (Zeitschr. f. wiss. Zool. xxxiv.)
8vo. *Leipzig*, 1880. **N. H. W. MacLaren.**
- Spinner (Henri).** Des relations existant entre la disposition du parenchyme vert dans les feuilles de *Carex* et les localités habitées par ces végétaux. Pp. 3. (Bull. Soc. Neuchâtel. Sci. Nat. xxxi.)
8vo. *Neuchâtel*, 1903.
- Sur les fruits anormaux de *Cheiranthus*. Pp. 7, figs. 18. (Bull. Soc. Neuchâtel. Sci. Nat. xxxii.) 8vo. *Neuchâtel*, 1905.
- L'Anatomie caulinaire des *Carex* Suisses. Pp. 94; plates 3. (Bull. Soc. Neuchâtel. Sci. Nat. xxxii.) 8vo. *Neuchâtel*, 1905.
Author.
- Spire (André).** See **Spire (Camille).** Le Caoutchouc en Indo-Chine.
- Spire (Camille) et Spire (André).** Le Caoutchouc en Indo-Chine. Étude Botanique Industrielle et Commerciale. Pp. viii, 262; plates 35. Roy. 8vo. *Paris*, 1906.
- Spruce (Richard).** Hepaticæ Amazonicæ et Andinæ, &c. Pp. xi, 588; plates 22. (Trans. & Proc. Bot. Soc. Edinb. xv.)
8vo. *Edinburgh*, 1884-85.
- Staeps (Arminius).** De Trichiniasi. Dissertatio Inauguralis. Pp. 30. 8vo. *Berlin*, 1866. **N. H. W. MacLaren.**
- Stebbing (Edward Percy).** A Note upon the "Bee-Hole" Borer of Teak in Burma (*Duomitus*). Pp. 19. 4to. *Calcutta*, 1905.
- Departmental Notes on Insects that affect Forestry. No. 3. 8vo. *Calcutta*, 1906. **Author.**

- Stebbing (Thomas Roscoe Rede). *See* Maldive and Laccadive Archipelagoes. Marine Crustacea: Isopoda.
- Stichel (Hans). *See* Berlin—Das Tierreich. Liefg. 22. Lepidoptera: Heliconiidae.
- Stossich (Michele). Elminti trovati in un *Orthagoriscus mola*. Pp. 3, tav. 1. (Boll. Soc. Adriatica, xvii.) 8vo. Trieste, 1896.
N. H. W. Maclaren.
- Strachey (Sir Richard). Catalogue of the Plants of Kumaon and of the adjacent Portions of Garhwal and Tibet, based on the Collections made by Strachey and Winterbottom during the years 1846 to 1849 and on the Catalogue originally prepared in 1852. Revised and Supplemented by J. F. DUTHIE. Pp. vii, 269. 8vo. London, 1906. Author.
- Sullivant (William Starling). Icones Muscorum, or Figures and Descriptions of most of those Mosses peculiar to Eastern North America which have not been heretofore figured. Pp. viii, 216; plates 129. Roy. 8vo. Cambridge, Mass., 1864.
— — — Supplement. [Ed. by A. GRAY.] Pp. viii, 109; plates 81. Roy. 8vo. Cambridge, Mass., 1874.
Dr. R. Braithwaite.
- Swainson (William) to Audubon (John James). (Hitherto unpublished Letters.) *See* Deane (Ruthven).
- Sydney.
Australian Museum.
Catalogue of the Library of the Australian Museum. Second Edition. Compiled by S. SINCLAIR. Part III. Pamphlets. 8vo. Sydney, 1905.
- Taschenberg (Ernst Otto Wilhelm). Beiträge zur Kenntniss ectoparasitischer mariner Trematoden. Pp. 49, Taf. 2. (Abh. naturf. Ges. Halle, xiv.) 4to. Halle-a.-Saale, 1879.
— *Didymozoon*, eine neue Gattung in Cysten lebender Trematoden. Pp. 12, Taf. 1. (Zeitschr. f. ges. Naturwiss., Bd. 52.) 8vo. Berlin, 1879. N. H. W. Maclaren.
- Tattersall (W. M.). *See* Holt (Ernest W. L.). Schizopodous Crustacea from the North-East Atlantic Slope. Supplement.
- Tesch (J. J.). Die Heteropoden der Siboga-Expedition. *See* Siboga-Expeditie, Livr. 29.
- Thellung (A.). *See* Naegeli (Otto). Die Flora des Kantons Zürich.
- Thompson (D'Arcy Wentworth). *See* Sea Fisheries. North Sea Fisheries Investigation Committee. Report on Fishery and Hydrographical Investigations in the North Sea and Adjacent Waters.
- Torino (Damián M.). Memoria presentada al H. Congreso de la Nacion. Vol. 3. 8vo. Buenos Aires, 1905.
- Trautvetter (Ernst Rudolf von). Floræ Rossicæ Fontes. Pp. 342. (Acta Horti Petrop. vii.) 8vo. St. Petersburg, 1880.

'Triton,' Cruise of H.M.S. (Trans. Roy. Soc. Edinburgh, xxxii.)
4to. *Edinburgh*, 1883.

Pycnogonida. By P. P. C. HOEK.

Tunicata. By W. A. HERDMAN.

Pennatulida. By A. MILNES MARSHALL.

Asteroidea. By W. PERCY SLADEN.

Tschudi (Ad.). Die Blasenwürmer. Ein monographischer Versuch.
Pp. 75; Taf. 2. 4to. *Freiburg-im-Breisgau*, 1837.

N. H. W. MacLaren.

Turner (Frederick). Botany of North-Western New South Wales.
Pp. 60; plate 1. (Proc. Linn. Soc. N. S. Wales, xxx. pt. 1.)

8vo. *Sydney*, 1905. Author.

United States Department of Agriculture (con.).

Division of Botany.

Contributions from the U.S. National Herbarium. Vol. X.

Pts. 1, 2.

8vo. *Washington*, 1906.

B. Daydon Jackson.

United States Geological Survey (con.).

Monographs. Vols. 47, 48. 4to. *Washington*, 1904-05.

47. A Treatise on Metamorphism. By CHARLES RICHARD VAN HISE.

Pp. 1286; plates 13, figs. 32. 1904.

48. Status of the Mesozoic Floras of the United States. Second Paper.

By LESTER FRANK WARD. Pp. 616; plates 119. 1905.

Van Hise. See Hise (Richard Charles van).

Vávra (Wenzel). See Plankton-Expedition. Die Ostracoden
(Halocypriden und Cypridiniden).

Veitch (James Herbert). Hortus Veitchii. A History of the
Rise and Progress of the Nurseries of Messrs. JAMES VEITCH &
SONS, together with an Account of the Botanical Collectors and
Hybridists employed by them, and a List of the most remarkable
of their Introductions. Pp. 542. Illustrated with Fifty Photo-
gravure Plates. 4to. *London*, 1906. Jas. Veitch & Sons.

Vejdovsky (Franz). Ueber einige Süßwasser-Amphipoden. III.
Die Augenreduktion bei einem neuen Gammariden aus Irland,
und über *Niphargus* Caspary Pratz aus dem Brunnen von
München. Pp. 40, mit 2 Tafeln und 14 Textfiguren. (S.B.
Königl. Böhm. Ges. Wiss. Prag, 1905.) 8vo. *Prag*, 1905.

Author.

Versluys (Jan). See Siboga-Expeditie. Die Gorgoniden der
Siboga-Exped. II. Die Primnoidæ.

Verson (Enrico). Zur Entwicklung des Verdauungskanalns bei
Bombyx mori. Pp. 78; Taf. 4. (Zeitschr. wiss. Zool. Bd. 82.)

8vo. *Leipzig*, 1905. Author.

Vialleton (Louis). See Lortet (Louis). Étude sur le *Bilharzia*
heematobia et la Bilharziose.

Vierhapper (Fritz). Monographie der alpinen *Erigeron*-Arten
Europas und Vorderasiens. Pp. 176; Taf. 6, Karten 2. (Beih.
Bot. Centralbl. 2te Abt. xix.) 8vo. *Leipzig*, 1906.

Vormeng (Carl). Die Bandwürmer des Menschen nach den
neuesten Forschungen. Inaugural-Dissertation. Pp. 32.

8vo. *Berlin*, 1867. N. H. W. MacLaren.

- Waddell (Lawrence Austine). Lhasa and its Mysteries; with a Record of the Expedition of 1903-1904. Pp. xxii, 530; with 200 illustrations and 8 maps. 8vo. London, 1905. Author.
- Wagner (M.). Psychobiologische Untersuchungen an Hummeln. I. (Zoologica, Bd. xix. Heft 46¹.) 4to. Stuttgart, 1906.
- Wahlstedt (Lars Johan). Om Characeernas knoppar och öfvervintring. Botanisk Afhandling. Pp. 48. 8vo. Lund, 1864.
- Walker (Alfred O.). See Maldive and Laccadive Archipelagoes. Marine Crustaceans: Amphipoda.
- Walter (Emil). Untersuchungen über den Bau der Trematoden. *Monostomum trigenocephalum*, Rud., *reticulare*, van Ben., *proteus*, Brandes. Inaugural-Dissertation. Pp. 51; 3 Tafeln und 1 Textfigur. (Zeitschr. wiss. Zool. Bd. 56.) 8vo. Halle-a.-Saale, 1893. N. H. W. Maclaren.
- Walter (Herbert E.). See Brooklyn Institute of Arts and Sciences. Cold Spring Harbor Monographs. VI. The Behavior of the Pond Snail (*Lymnæus elodes*, Say).
- Ward (Lester Frank). Status of the Mesozoic Floras of the United States. Second Paper. Pp. 616, plates 119. (U.S. Geol. Surv., Monogr. 48.) 4to. Washington, 1905.
- Warren (Ernest). See Annals Natal Govt. Mus. Washington.
- Carnegie Institution.
Publication no. 8. 8vo. Washington, 1905.
No. 8. FARLOW (WILLIAM G.). Bibliographical Index of North American Fungi. Vol. I. Part 1. 1905.
- Watkin (Hugh R.). The Discovery and Transportation to St. Petersburg of the Berezooka Mammoth, translated and described in a Paper read before the Torquay Natural History Society. Pp. 20. 8vo. Torquay, 1906.
- The White Winter Coat of Certain Creatures. Read July 11th, 1906, before the Torquay Natural History Society. Pp. 20. 8vo. Torquay, 1906. Author.
- Weber (Carl Julius Ferdinand). De *Echinococco Hominis*. Dissertatio Inauguralis. Pp. 32. 8vo. Berlin, 1866.
N. H. W. Maclaren.
- Weismann (August). The Germ-Plasm: a Theory of Heredity Translated by WILLIAM NEWTON PARKER and HARRIETT RÖNNFELDT. (Contemp. Science Ser.) Pp. xxii, 477, with 24 illustrations. 8vo. London, 1893.
- West (George). A Comparative Study of the dominant Phanerogamic and Higher Cryptogamic Flora of Aquatic Habit, in Three Lake Areas of Scotland. Pp. 58, plates 55. (Proc. Roy. Soc. Edinb. xxv. pp. 967-1023.) 8vo. Edinburgh, 1905.
- West (William) and West (George Stephen). A Monograph of the British Desmidiaceæ. Vol. II. Pp. x, 204; plates 33-64. (Ray Society.) 8vo. London, 1905.
- Willis (John Christopher). See Peradeniya: Royal Botanic Gardens. Annals.

- Wintons (A. L.). *See* Moeller (Josef). Mikroskopie der Nahrungs- und Genussmittel aus dem Pflanzenreiche. Zweite Auflage.
- Wittrock (Veit Brecher). Catalogus Illustratus Leonothecæ Botanicae Horti Bergiani Stockholmiensis; Notulis Biographicis adjectis. Pars II. Pp. xciii, 245; cum 151 tabulis. (Acta Horti Bergiani, Band iii. No. 3.)
4to. *Stockholm*, 1905. Author.
- Wolfenden (Richard Norris). *See* Maldive and Laccadive Archipelagoes. Copepoda.
- Wolff (Max). Das Nervensystem der polypoiden Hydrozoa und Scyphozoa. Ein vergleichend-physiologischer und anatomischer Beitrag zur Neuronlehre. Pp. 91, Taf. 5. (Zeitschr. f. allgem. Physiol. Bd. iii. Heft 3.)
Svo. *Jena*, 1903.
N. H. W. MacLaren.
- Wood (John Medley). Natal Plants. Vol. IV. Parts 3 & 4; Vol. V. Part 3. 4to. *London*, 1905-1906. Author.
- Woodward (Arthur Smith). On a Carboniferous Fish Fauna from the Mansfield District, Victoria. *See* Melbourne: National Mus. Memoirs, no. 1.
- Woodward (Arthur Smith) and Seward (Albert Charles). Permo-Carboniferous Plants and Vertebrates from Kashmir. Pp. 14, plates 3. (Mem. Geol. Surv., Palæont. Ind., New Series, vol. ii. Mem. No. 2.)
Fol. *Calcutta*, 1904.
- Woodward (Bernard Barham). *See* Sherborn (Charles Davies). On the Dates of Publication of the Natural History Portions of the 'Encyclopédie Méthodique.'
- Worcester (Dean C.). *See* McGregor (Richard C.). A Hand-List of the Birds of the Philippine Islands.
- Wright (Herbert). Report of the Controller, Experiment Station, Peradeniya, for 1903. Pp. 44. (Circulars & Agric. Journ. Roy. Bot. Gardens, Ceylon, vol. ii. no. 18.) Svo. *Peradeniya*, 1905.
- Indian Corn (*Zea Mays*, L.) in Ceylon. (Circulars & Agric. Journ. Roy. Bot. Gardens, Ceylon, vol. iii. no. 5.)
Svo. *Peradeniya*, 1905.
- Cocoa Disease in Ceylon. Pp. 4, plate 1. (Tropical Agric. & Mag. Ceylon Agric. Soc. Aug. 1905.)
4to. *Colombo*, 1905.
- Historical Notes regarding Para Rubber in Ceylon and the East. Pp. 3; plate 1. (Tropical Agric. & Mag. Ceylon Agric. Soc. Aug. 1905.)
4to. *Colombo*, 1905.
- Foliar Periodicity of Endemic and Indigenous Trees in Ceylon. Pp. 102; plates 6. (Ann. Roy. Bot. Gardens, Peradeniya, vol. ii. part 3.)
Svo. *Colombo*, 1905.
- *Hevea brasiliensis* or Para Rubber; its Botany, Cultivation, Chemistry, and Diseases. Pp. viii, 106, Appendix xx; plates 28.
Svo. *Colombo*, 1905.
- Second Edition. Pp. xiii, 179; plates 54.
Svo. *Colombo*, 1906. Author.

- Wright (Herbert) and Bruce (Alexander). Para Rubber in Ceylon.
Pp. 32. (Circulars & Agric. Journ. Roy. Bot. Gardens, Ceylon,
vol. iii. no. 6.) 8vo. *Peradeniya*, 1905. Authors.
- York, Eastleigh, Birmingham, and Cambridge.
Watson Botanical Exchange Club. Reports, Vol. II. No. 2.
8vo. *Cambridge*, 1906. G. Goode.
- Zacharias (Otto). See *Archiv für Hydrobiologie und Plankton-
kunde*.
- Zaczek (Johann). Die Trichinose. Inaugural-Dissertation.
Pp. 31. 8vo. *Berlin*, 1868. N. H. W. Maclaren.
- Zelinka (Carl). Die Gastrottrichen. Eine monographische Dar-
stellung ihrer Anatomie, Biologie und Systematik. Pp. 178,
Taf. 5. (Zeitschr. wiss. Zool. Bd. 49.)
8vo. *Leipzig*, 1889. N. H. W. Maclaren.
- Zeller (Ernst). Ueber das encystirte Vorkommen von *Distomum
Squamula*, Rud., im braunen Grasfrosch. Pp. 4, Taf. 1. (Zeitschr.
wiss. Zool. Bd. 17.) 8vo. *Leipzig*, 1867.
- Weiterer Beitrag zur Kenntniss der Polystomen. Pp. 37,
Taf. 2. (Zeitschr. wiss. Zool. Bd. 27.)
8vo. *Leipzig*, 1876. N. H. W. Maclaren.
- Zittel (Karl Alfred von). Gedächtnisrede auf KARL A. von ZITTEL,
gehalten in der öffentlichen Sitzung der K.B. Akademie der
Wissenschaften zu München zur Feier ihres 146. Stiftung-
stages am 15. März 1905, von AUGUST ROTHPLETZ. Pp. 23.
4to. *München*, 1905.
- Zoological Record. Vol. 41 (1904). 8vo. *London*, 1905.
- Zschokke (Fritz). Erster Beitrag zur Parasiten-fauna von
Trutta salar. Pp. 35, Taf. 1. (Verh. Naturf. Ges. Basel, viii.)
8vo. *Basel*, 1890. N. H. W. Maclaren.
- Zürich.
Botanisches Museum der Universität, Zürich.
Mitteilungen XXXI.
SCHINZ (HANS). Die Myxomyceten oder Schleimpilze der Schweiz.
Pp. 129, figs. 45. (Mitt. Nat. Ges. Winterthur, Heft 6.)
8vo. *Winterthur*, 1906.
- Der botanische Garten und das botanische Museum der
Universität, Zürich, im Jahre 1905. 8vo. *Zürich*, 1906.
Dr. Hans Schinz.

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[*The following Obituary Notice was only received on the 27th September, after the foregoing pages were in type.*]

WALTER FRANK RAPHAEL WELDON, the subject of the present memoir, was born on March 15th, 1860, and was educated at Caversham School and afterwards, during 1876 and 1877, at University and King's Colleges, London. In April 1878 he entered St. John's College, Cambridge, and studied Physiology and Zoology under Prof. Michael Foster and the late Francis Maitland Balfour. He obtained a first class in the first part of the Natural Science Tripos (under the old Statutes) in 1881 and proceeded to the degree of B.A. in the same year. In 1882 he was placed in the first class in the second part of the Natural Science Tripos, and after a period of study at the Zoological Station at Naples, was resident chiefly at Cambridge, where he was engaged in zoological research, and acted as a Demonstrator to Mr. A. Sedgwick and Assistant Lecturer in the Zoological Laboratories. He married in 1883 Florence Joy, the eldest daughter of William Tebb, Esq., of Rede Hall, Burstow, Surrey, and never was there a happier marriage. In November 1884 Weldon was elected to a Fellowship at St. John's College, and almost simultaneously was appointed University Lecturer in the Advanced Morphology of Invertebrata at Cambridge. In 1886, a year after his father's death, he went in company with his wife on a zoological expedition to the Bahamas, and returning to Cambridge at the end of the same year, resumed his work as University Lecturer. In 1888, on the completion of the Laboratory of the Marine Biological Association at Plymouth, Weldon was one of the first to make use of the opportunities offered for the study of English Marine Zoology, and having obtained leave of absence from Cambridge, he resided at Plymouth for two years, and there began the course of biometrical research which was the chief interest of the rest of his life. In December 1890 he was elected to the Jodrell Chair of Zoology in University College, London, in succession to Professor Ray Lankester; and in 1899, when the latter was appointed Director of the British Museum of Natural History, Weldon again succeeded him, this time as Linacre Professor of Comparative Anatomy at Oxford. For the next seven years he resided at Oxford, occupied with the duties of his chair and with a constantly increasing quantity of biometrical research. Though he was obviously straining his energies to the utmost his health and vigour seemed to be unimpaired, and it was a great shock to his many friends when they heard of his death, after a very short illness, on April 13th, 1906. He was elected Fellow of our Society, 4th June 1891, and of the Royal Society in 1890.

Such is a brief outline of the life of one of the most gifted of contemporary zoologists: it would take many pages adequately to

fill in the picture with an account of his scientific work and an appreciation of his loveable personality. A few salient features may be dwelt on here.

Professor Weldon was the eldest son (his younger brother Dante died in 1881) of the late Walter Weldon, F.R.S., distinguished both in Journalism and Chemical Science, well known for his invention for the recovery of Chlorine in the Leblanc Soda-process, and one of the founders of the Society of Chemical Industry. It was said that the most remarkable characteristic of the father was "the marvellous avidity and thoroughness with which he grasped any subject upon which he brought his mind to bear. A strong and active mind was allied with a constitutional power and capacity and love of work which it is the good fortune of few to possess." The qualities that brought distinction to the father were inherited in full measure by the distinguished son. In his earliest days at Cambridge Raphael Weldon (he was always called by the last of his Christian names) was remarkable, even among the brilliant company of young zoologists gathered there under Francis Balfour, for his unusual enthusiasm for Zoology, and his University career was, like the rest of his life, devoted to his favourite study. He was a vigorous member and supporter of the Cambridge University Natural Science Club, and one of his contemporaries records that he used, when an undergraduate, to maintain the superiority of intellectual over material pleasures. To those who did not know him this might savour of youthful pedantry, but it was a simple and unaffected statement of his real pleasure in life. Intellectual as he was, Weldon had nothing of the pedant or recluse about him, and was impatient of all affectation of superior wisdom. Among the many rare qualities combining to make up a charming personality, sincerity was perhaps the most conspicuous, and to perfect candour was added a certain whimsical humour which made his conversation peculiarly attractive. While holding fast to his ideal of intellectual pleasure, Weldon was eminently sociable and full of human sympathy. He loved to surround himself with friends, and from the early days of his residence at Cambridge his rooms or his house were a centre of hospitality and good fellowship. Never did he appear to greater advantage than when entertaining his friends. On such occasions conversation would turn mainly on subjects of zoological controversy, which Weldon would discuss with the most admirable vivacity and spirit. No subject, however abstruse, could be dull in his hands. He would keep a room full of zoologists in roars of laughter while he argued some highly technical point in racy and unconventional language, with a wealth of illustration and anecdote that gave inimitable charm and interest to his discourse. On such occasions, and they were frequent, one could see how genuine and spontaneous was his love of Science. To his mind it was a fertile territory, abounding in gladness and beauty, where there were no arid wastes and no

dreary and desolate places. In this happy view of his life's work he was doubtless assisted by an uncommon power of working hard without any feeling of laborious effort. A friend of his has remarked that he had, like his father, a great facility for extracting the kernel of a memoir or book without wading through a very large proportion of the words. He instinctively fastened upon what was essential, and made it his own, and would read through a surprising amount of difficult and often dry literature without any apparent effort. Moreover, he was an excellent linguist and could not only read but speak several languages with ease and fluency. The same faculties that made Weldon a brilliant conversationist made him a lecturer of exceptional merit. He had a strong dramatic instinct, and utilized it to the full in the lecture-theatre and class-room. Aided by a natural aptitude for drawing, he would develop a subject both by speech and by finished drawings on the black-board, till it seemed to grow under his hands, and the driest subjects of anatomy took life and became replete with interest. His lectures at University College attracted not only a large class of students but also many of his colleagues, and his public courses of lectures at Oxford were no less successful.

Weldon's zoological work falls naturally into two periods. Trained at Cambridge under Prof. Francis Balfour, he naturally came under the influence of the embryological and morphological school of thought then dominant not only in England but on the Continent. His earliest papers of importance were published in 1883. One, on the early development of *Lacerta muralis*, is a careful piece of embryological work, such as was produced in considerable quantity at Cambridge at that period. The other, on some points in the anatomy of *Phaenicopterus* and its allies, was the outcome of work carried on in the Zoological Society's Gardens.

For some years after taking his degree Weldon followed the prevailing trend of zoological thought, and hoped, as the best zoologists then hoped, that the chief problems of animal evolution would be on a fair way to solution as embryological evidence accumulated. With this object in view, he made frequent journeys abroad to collect embryological material or to study the development of some marine organism on the spot. His expedition to the Bahamas was made with the purpose of studying the development of the Tornaria larva of *Balanoglossus*. Between 1883 and 1889 he published several memoirs, all distinguished for careful and methodical observation and considerable originality in morphological speculation, but their contents need no special mention in this place. When he went to Plymouth in 1888 his purpose was to study the development of the Crustacea, and for more than a year he applied himself diligently to this work, though his memoirs on the renal organs of the Decapoda and the development of the Common Shrimp did not appear till 1891 and 1892. But

like some of his Cambridge contemporaries, he had become dissatisfied with the methods of zoological reasoning then in vogue. It was consistent with his sincerity of character and purpose that he could not accept conclusions based upon what seemed to him to be imperfect argument and insufficient evidence, and he found that the mode of argumentation commonly in use, though ingenious, was lacking in rigour of scientific proof. At this time a considerable body of young naturalists was collected in the Plymouth Laboratory, and discussions on the validity of the doctrine of Natural Selection were frequent. Weldon was ever a firm upholder of Natural Selection, and in these discussions took up an attitude of firm opposition to the theories of Eimer and the neo-Lamarckian school. At the same time he could not give unqualified assent to the brilliant speculations of Weismann, then at the height of their influence, finding them, like the rest of current morphological speculation, too vague and too deficient in rigorous demonstration. Being therefore dissatisfied with the methods he had hitherto employed, Weldon turned his attention to the works of Francis Galton, and on reading these more attentively than he had done before, was immediately attracted by the prospect of introducing exact mathematical proof into zoological argument. The writer well remembers his coming into the Plymouth Laboratory one morning, armed with Galton's 'Natural Inheritance,' the contents of which he forthwith proceeded to expound with his accustomed eagerness. He pointed out that since the time of the publication of the 'Origin of Species,' zoologists had blindly accepted Darwin's conclusions, but, with few exceptions, had neglected Darwin's methods. "Science," he said, "is measurement: Darwin made use of measurement, and if we are to make any progress his example must be followed." This was the turning-point of Weldon's career. With characteristic energy he proceeded to apply to animals the statistical methods used by Galton in anthropometric researches, and as he was engaged at the time with the development of the Shrimp, he chose this animal for his first essay in what he afterwards called Biometrics. Collecting large numbers of shrimps from three different localities, he found that the results of his measurements confirmed what Galton had established for man and domesticated animals, and, further, that the "probable error" of the same organ was different for the three groups of shrimps from Plymouth, Southport, and Sheerness*. In other words, the shrimps from these localities form three distinct races. Encouraged by the success of his first effort, Weldon set to work to prepare himself for extended investigations of a like nature. Finding at the outset that his knowledge of statistics was insufficient, he put himself through a course of mathematical study, and in a short time was fully equipped for the prosecution of higher statistical

* "The Variations occurring in certain Decapod Crustacea.—I. *Crangon vulgaris*," Proc. Royal Soc. vol. 47 (1890).

researches. A second paper on the Correlated Variations in *Crangon* appeared in 1893, and about the same time he became a member of a committee of the Royal Society formed for the purpose of "Conducting Statistical Enquiries into the Measurable Characteristics of Plants and Animals." In connection with this Committee, he began an investigation on the variability of the breadths of the frontal carapace in the common shore-crab, *Carcinus maenas*, and this led to what was probably the most brilliant of his discoveries. He found that the mean frontal breadth of crabs taken from Plymouth Sound was diminishing at a relatively rapid rate, and came to the conclusion that this diminution was due to the changed conditions of Plymouth Sound owing to the great increase of the population of the three towns discharging their refuse into a bay nearly completely closed by a huge artificial breakwater, and also to the large quantities of china-clay discharged into the Sound. To prove this, he undertook the most laborious experiment of keeping a large number of crabs in water in which a quantity of finely divided china-clay was kept suspended, and he found that the crabs with broader frontal carapaces, and therefore wider respiratory apertures, were choked by the china-clay and died, while those with narrower frontal carapaces survived. By a still more laborious experiment he showed that in a number of young crabs reared in clean water, and therefore protected from the pernicious effect of mud and china-clay in suspension, the mean frontal breadth was raised above that of wild crabs of their own size living in Plymouth Sound. This convincing experiment formed the subject of Weldon's brilliant Presidential Address to the Zoological Section of the British Association at Bristol in 1898; and it remains an almost unique instance of a clear demonstration of the operation of Natural Selection in actual progress, while it at the same time silenced those who objected that small and apparently useless variations could not be preserved by Natural Selection. What could seem more useless than a slight diminution of the breadth of the carapace of a crab? Yet a more extended knowledge showed that it is in fact useful under certain conditions and is preserved by Natural Selection.

At University College Weldon found a congenial spirit in Professor Karl Pearson, who, like himself, had been fired with enthusiasm for the statistical study of biological problems initiated by Galton, and the mathematical professor was soon able to render his colleague the most important assistance by the solution of the problem of dealing with the asymmetrical distribution of variations. They quickly became fast friends, and their cooperation has marked an epoch in statistical biological research.

In a short time Weldon, whose enthusiasm was contagious, had a group of young and ardent naturalists working under his direction, and in order to give expression to the new school of zoological thought thus growing up under his guidance, he initiated in 1901, in conjunction with Mr. Francis Galton, Professor Karl

Pearson, and Professor C. B. Davenport, a new journal, 'Biometrika,' to which he continued to contribute important statistical papers up to the time of his death. Unfortunately much of the work upon which he was engaged during the last few years remains unpublished. Much of it was of an exceedingly laborious and time-consuming nature. It would be difficult to give an idea of the technical difficulty and time required to collect the data for his paper on the study of Natural Selection in *Clausilia laminata*, published in the first number of 'Biometrika.' It involved the grinding down by hand of hundreds of fragile shells, and afterwards carefully measuring them. He continued these investigations amid much other work, from 1902-1906, and had prepared a number of sections for a similar paper upon snails of the genus *Helix*, but the work was left unfinished. He had been for the last four years deeply engaged in a controversy on the validity of Mendel's law, and many of his friends regretted that he took up from the first such an attitude of uncompromising opposition to what seemed to many to be a most promising instrument of research. But his attitude was hardly understood. He demanded more exact definitions and a more rigorous proof founded upon a larger number of instances than the adherents of Mendel were prepared to give in the earlier stages of the controversy; and when, true to his own principles, he put Mendel's hybridization results to proof, he found discrepancies which he was unable to reconcile by the exact statistical methods which he employed. He spared no pains to arrive at the truth, and instituted experiments on the hybridization of domesticated races of mice on a very large scale. Some of the results of these experiments have been published by his pupils Mr. E. A. Schuster and Mr. A. D. Darbishire; but the enquiry was still in progress at the beginning of the present year, and the data have been carefully collected and will form the subject of a posthumous memoir by Professor Karl Pearson.

Weldon had also projected and had written some part of a book on the Statistical aspect of Heredity and Variation, and it is hoped that the chapters left completed at his death may give a clue to his latest opinion on the subject.

These few fragments descriptive of an energetic scientific life will serve to show how great was the loss sustained by Zoology when so exact and yet so original an investigator was cut off in the fulness of his powers. Much as he had already done, Weldon had much more to accomplish, and he had set himself work from which results of the highest importance must have been derived. Beyond the loss to scientific thought there is the loss, to a large circle of friends, of one whose high character, affectionate and generous disposition, combined with wit and humour, leaves a void which cannot be filled. *Multis ille bonis flebilis occidit!* [G. C. B.]

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